Career Paths in Oral Health

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Preface

Oral health professionals continue to be in great demand as skilled practitioners who provide expertise in the assessment, prevention, diagnosis and treatment of injuries, diseases and conditions, deformities or lesions of the human teeth, mouth, jaw and associated structures. Oral health professionals (OHPs) have a highly diverse range of career opportunities and career paths open to them—never more so than today. These careers include, but are not limited to, clinical oral health practice in both general dentistry and specialties (in private practices, community centres and hospitals), academic work (both teaching and research) and non-traditional careers, for example in community, government, administration, policymaking and government research. OHPs' skills also translate into areas as diverse as dental materials development and manufacturing, clinical trials and outcomes evaluation.

The practice of oral health care includes a wide variety of roles and careers, and many students in the early stages of their studies in oral health may not be aware of the breadth of their future profession and its many specialties. *Career paths in oral health* is a reference guide for anyone considering a career in oral health. The book addresses the growing demand among oral health professions' students and professionals for comprehensive information about the careers available in oral health and the many roles an oral health professional can play. *Career paths in oral health* describes the different pathways to these many careers, the educational requirements and the ideal character strengths and interests. This book provides the reader with an understanding of the different career paths OHPs can take. It is a detailed and descriptive career guide for today's oral health professionals.

Career paths in oral health caters to readers who are seeking an introduction to the oral health professions field, who wish to consider new possibilities for themselves within the field or who wish to acquaint themselves with contemporary issues and debates within the profession, for example on topics such as selection criteria and professional development. This book is also ideal for readers seeking more personal portraits of different careers in oral health, such as undergraduate students choosing a career path and oral health graduates who may feel unsure about their career options.

The chapters' authors have been carefully selected to represent the diverse range of views which exist regarding OHP, as well as for their expertise and authority in their specific topic areas. Authors also cover their topics from an international perspective;

they are from various countries and both academic and non-academic backgrounds. The authors have been selected for their distinction in particular careers and include in their contributions insights gained from personal experience. The chapters are presented using a similar model: starting with a general overview of the career or career path, each chapter outlines entry and educational requirements, including skills and personal attributes. Personality traits needed for success in the career are discussed, as well as a review of the responsibilities and advantages and disadvantages of working in each field.

This book is organised into five parts and thirteen chapters. The writing reflects the broad readership base we want to serve, with the book adopting a scholarly but accessible style which will appeal to undergraduate and postgraduate audiences as well as to broader sections of the community. The chapters are written by leading international scholars and address the following questions:

- Why pursue a career in oral health?
- How would an oral health professional benefit his/her patients/the community by his/her involvement in oral health?
- What education and other background is needed to have a career in oral health?
- What are some of the advantages and disadvantages of the oral health professions?

A strength of each chapter is the authors' personal stories and descriptions of why and how each one took the career path they did. Thus, each chapter includes personal insights from the authors and co-authors as well as invited contributors and highlights lessons gained from personal experience. Some chapters also include recommended further readings.

Part I "Choosing oral health as a career" comprises four chapters which critically examine the history of the professions, their practices and the many legal and other aspects involved. This section also describes the responsibilities of various oral health professions and gives a general overview of the required skills and personality traits.

The second part "Clinical career path in oral health" includes two chapters which describe the main aspects of the practice of dentistry, including its specialties. This section discusses career options and opportunities for general dental practitioners (GDPs) and how GDPs can enrich their professional life by obtaining additional experiences and education. The chapters also present profiles of oral health professionals working in various specialties.

Part III "Non-clinical career paths in oral health" has four chapters which review non-clinical career paths and non-traditional dental careers, career paths in organised dentistry and international organisations and career paths in the dental industry. The goal is to construct a sampling frame that represents oral health professionals in non-clinical specialties.

The fourth part "Academic career paths in oral health" has two chapters. This section describes careers in academic research, including how oral health professionals can benefit from research, even if they do not want to pursue a career

in academic research or in dental education. This includes details of the training paths and opportunities to follow to develop research skills and credentials.

The final part has only one chapter concerning occupational health and retirement. This chapter is a survival guide for oral health professionals and discusses key issues around health and retirement.

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Part I

Choosing Oral Health as a Career

Dentistry in a Historical Perspective and a Likely Future of the Profession

1

Ole Fejerskov, Sergio Uribe, and Rodrigo J. Mariño

Abstract

From the earliest times, humans have shown concern for oral diseases and how to repair their effects. Archaeological findings show signs of dental caries in several ancient cultures, with the earliest evidence of any dental intervention found in a pair of 13,000-year-old teeth in Italy. By the middle of the twentieth century, dentistry had become well established as a technical expertise where the dentist could perform delicate operative procedures in the oral cavity. The focus shifted from the surgical to the restorative, which allowed restoring damaged teeth, with the aim of keeping the teeth functioning in the mouth. While modern oral health care has benefited enormously from advances such as fluoridation, the oral health professions still face significant challenges, such as the major inequalities in oral health, both within and between countries in terms of disease severity and prevalence. Looking to the future, there are key trends which will greatly influence how oral health care is conceptualised and organised, how oral health care personnel are trained and how they will deliver health services to the population. These trends are: the pervasive use of communication and information technologies, world globalisation and migratory movements, the ageing of the world population and climate change.

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1.1 Introduction

At all times and for all people, oral diseases and conditions have been part of life, in the forms of trauma, genetic disorders, caries, periodontal inflammation and tumours. In all ancient cultures, from Mesopotamia, Greece and Rome to China and the Americas, there is evidence that these conditions have been treated with various remedies and instruments indicative of "professionals" operating. We can also find evidence in art and literature, with conditions causing oral pain commonly portrayed.

Today, oral diseases and conditions are among the most prevalent health concerns in humanity. Despite cost-effective methods of prevention having been available for years, these diseases and conditions are often falsely regarded as inevitable and even "natural". Oral diseases are recognised by the public and government as a major health problem, often resulting in pain and infections of the head and neck region, leading to impaired function. They have a significant negative impact on people's quality of life. The high prevalence and recurrent nature of dental caries and periodontal disease makes the mouth one of the most expensive parts of the body to treat and in some countries dental treatment costs are claimed to be higher than for cancers and heart disease. There is a marked social gradient and substantial inequalities in oral health—as with health in general—in all populations, irrespective of countries. In recent years, the experience in some parts of the world has clearly demonstrated that control and prevention of the most prevalent oral diseases, (e.g. dental caries and periodontal disease) can result in significant improvements in oral health. However, due to the above-mentioned social inequality, only a fraction of people in most countries have benefited, and among the majority of the world's population oral health remains poor.

The purpose of this chapter is to reflect on how dentistry has developed so far in most of the world. The chapter will attempt to answer the questions: where have we, the oral health profession, come from and where are we going in the twenty-first century? A recurrent theme is the question of whether we, as a profession, have been able to achieve a significant impact on the prevalence of oral diseases, which remain some of the most prevalent diseases affecting mankind.

There will be a description and review of the history of the oral health professions, because the past strongly influences the way we see the immediate future of these professions. This will touch upon changing oral health concepts and places the current paradigm within the long-term trends of the oral health professions. In order to accomplish this, the chapter is divided into three main sections. The first section is a "helicopter view" of the history of the profession. It summarises historical information on oral health care around the world and sets the background and context for a comparative description of different approaches to oral health care. The second section looks, in this fast changing world, at the future of the profession. The final section includes personal reflections from oral health professionals around the world and their experiences and reflections on the profession. We hope that this approach may lead to a better understanding of oral health and of issues concerning the training of oral health care personnel as

well as giving some directions to the organisation and practice of oral health care in the future.

1.2 History of Dentistry

While it is possible that there was a time when there were no specific "oral health professionals", as such, at all times and for all people oral diseases and conditions have been a concern and a focus of attention. In fact, dental caries is a disease easily observable in human archaeological excavations (Pezo and Eggers 2012). Therefore, it is not an easy task to summarise the genesis, growth and development of dentistry, without reducing it to a mere exposition of facts and dates. For the purpose of presenting this history as a wide overview of the profession and for clarity's sake, we have divided the dentistry journey into three stages: pre-historical/historical, pre-professional and professional.

1.2.1 Pre-historic Period

Archaeological findings indicate that some 10,000 years ago, with the advent of agriculture and gradual changes in diet (becoming softer and containing fermentable carbohydrates), dental problems were recognised. For example, in Egypt, the number of people with caries went from less than 1–20 per 100 with the arrival of agriculture (Greene et al. 1967).

However, the first dental lesion was found in a prehistoric reptile named *Labidosaurus hamatus* (lipped lizard), some 250 million years ago (Reisz et al. 2011). Caries is not a modern human disease (Pezo and Eggers 2012). The oldest evidence of dental caries was found in what is today Zambia. The remains of Homo rhodensis, a non-human primate, show extensive tooth destruction due to caries at around 650,000–150,000 BC. The remains also show signs of extensive periodontal disease and dental abscesses (Pezo and Eggers 2012). Neanderthals also show high prevalence of enamel hypoplasia, tooth loss and periodontal disease, but no evidence of dental caries (Pezo and Eggers 2012).

From the earliest times, humans have shown concern for oral diseases and how to repair their effects. In the pre-historic era, much of the medical practice was based on myths and was strongly influenced by religion and beliefs. The evidence supporting the choice of treatments was largely anecdotal and based on the experience of these early "practitioners". As an example, a Sumerian text from 5000 BC describes "tooth worms" as being responsible for toothache caused by dental decay. This is documented in a clay tablet from the Royal Library, which exposes this myth in a poetical manner. Such a belief persisted until the eighteenth century (Forrai 2009).

Archaeological findings of teeth and skull remains show signs of dental caries in several ancient cultures. The oldest evidence of any dental intervention was found in a pair of 13,000-year-old front teeth found in Italy which contain the earliest known use of fillings—made out of bitumen (Oxilia et al. 2017). More surprising is that

there have been people skilled to drill holes in teeth for more than 5000 years, as shown by Bennike and Fredebo (1986) in an ancient Danish skull dated about 3000 BC. Scanning electron microscopic pictures indicate that someone probably using a rotating flint stone had produced a circular hole on the root surface from the buccal side in a molar tooth.

In ancient Egypt, there is also evidence of the practice of dentistry as a medical discipline. The first known reference to a person identified as a dental practitioner is Hesi Re (2500 BC). An inscription on his tomb includes the title "*the greatest of those who deal with teeth, and of physicians*". Also, in the Ebers papyrus residing in the library of University of Leipzig, Germany, one of the oldest documents of medical knowledge, dated 1550 BC, there are numerous prescriptions for diseases of the mouth and teeth.

On the American continent, the Mayan, Incan and Aztec cultures also had advanced levels of dental procedures. In the ancient Mayan culture in Central America (Sharer 1994), skulls with jade-encrusted teeth have been found from the Middle Preclassical period, around 600 BC. These reflect the earliest indications of cosmetic dentistry and are located in the middle of the buccal surfaces of anterior teeth with the jade placed in circular cavities cut through the enamel.

In Europe, in the Etruscan culture (900–400 BC), examples of "dentures" have been found, and from the time the Roman empire was well established, around 6–4 BC, we know quite a lot about the symptoms and methods of cure for the most common oral conditions, thanks to books by Celsius (1960–1961) and Plinius (1951–1963). A striking feature was the recommendation that as long as pain could be relieved the tooth be kept in a functional state. Pain control might have been achieved by treating caries lesions with opium, saffron, pepper and more "exotic" components (fried worms, Nardus paste, spider eggs, etc). Based on studies of 86 carious teeth from Forum Romanum, dated 50–100 AD, we conclude (Fejerskov et al. 2012) that the teeth had been treated by regular removal of the contents of the carious cavity, prior to "pharmaceutical" treatment. This was possibly done with the many kinds of small spoon-shaped metal instruments available at the time (Milne 1907). These speculations are based on the observation of distinct zones of hypermineralisation deep in the dentin preceeding the caries dissolution, indicating some sort of intervention, as this phenomenon is not found in deep slowly progressing lesions with no intervention. Who made these treatments and finally extracted the teeth very elegantly without fracturing the fragile roots, we do not know. Archaeologists suggested that because these teeth were found together with more than 13,000 fragments of ceramics and glass pieces with traces of makeup, medicine and perfume, in a channel leading from a small taberna located at the podium of the Temple of Castor and Pollux, this could represent the first evidence of a beauty salon and dental clinic.

In 1210, the **Guild of Barbers** was established in France (Gelfand 1974). Barbers eventually evolved into two groups: surgeons who were educated and trained to perform complex surgical operations; and lay barbers, or barber-surgeons, who performed more routine hygienic services including shaving, bleeding and tooth extraction.

In the sixteenth century, two classic writers portrayed oral health. Shakespeare was not very generous about ageing and oral health, describing older adults: "second childishness, … *sans* teeth, *sans* eyes …" (Shakespeare W. *As you like it*. Act 2 Scene 7). Cervantes described how his fictional Knight-errant, Don Quixote, lamented the missing of a few molars:

> "Luckless that I am!" said Don Quixote, hearing the sad news his squire gave him; "I had rather they despoiled me of an arm, so it were not the sword-arm; for I tell thee, Sancho, a mouth without teeth is like a mill without a millstone, and a tooth is much more to be prized than a diamond" (Cervantes y Saavedra, The ingenious Gentleman Don Quixote of La Mancha. Chapter XVIII).

It is possible to find several other descriptions of dentistry and oral health in the literature of the sixteenth and seventeenth centuries (Martinez 1998). Mortality rates associated with dental diseases was high, for example, in the week of August 15–22, 1665, in London more than one hundred persons died from teeth-related diseases (Onion 2014).

From these few examples of pre- and historic periods of dentistry, it can be concluded that at least 2000 years ago there were hand instruments created for operative dental treatments and tooth extractions and someone took care of relief of dental pain. The three dominant reasons for developing a "dental profession" were evident: (1) Pain and pain relief; (2) Cosmetics and (3) The need for a certain functional replacement of lost teeth. The transmission of knowledge may have been mainly verbal and the approach of the profession was eminently surgical Painful teeth were removed.

1.2.2 Pre-professional Period

The beginning of the *pre-professional era* dates from the publication of the first dental book in English, "The operator for the teeth" by Charles Allen, in 1685. But it was the publication in 1728 of "Le Chirurgien Dentiste" by Pierre Fauchard, a French surgeon, which is considered the beginning of modern dentistry. Fauchard describes basic oral anatomy and function, signs and symptoms of oral pathology, removal of decayed tooth substance and restoration of teeth, etc. Pierre Fauchard is credited with being the Father of Modern Dentistry. In 1771, an equally important book was published by John Hunter where he describes the scientific basis for dental anatomy in his "The natural history of human teeth". In England, The Dental Hospital of London was created in 1858 and became the first clinical training site for dentists in Britain. The Royal College of Surgeons granted licenses in dental surgery—and in 1947 the Faculty of Dental Surgery was founded within the Royal College of Surgeons, England.

In Latin American countries, during the time of the Spanish and Portuguese rule, the dental care of the population was provided in very rudimentary form. Mostly untrained "practitioners", whether foreigners or nationals, practiced as "prácticos"

and phlebotomists. After independence, many foreigners migrated from Europe, including French "practitioners", with the aim of working in dental care. They also trained "local practitioners" to cover the dental demand, with some form of formal consent from the newly independent States. For example, in Chile, in 1839, the first Chilean, Mr. José León Estrada, was granted permission to practice dentistry after 16 months of preparation and training with the Frenchman Dr. Eugenio del Cambre. This practice became common until in 1854 the Chilean President Manuel Montt authorised the Hospital San Juan de Dios to provide a course of "Phlebotomy".

1.2.3 Professional Period

In the previous section, we described how, for almost 2000 years, there was a refinement of operative techniques and materials as dental care emerged and became organised as a distinct dental profession. In most parts of the world, it was logical to let dentists be a sub-fraction of general surgery and dentistry was taught within the medical curriculum so that dentists were medical doctors specialising in oral health problems. Thus, explaining the designation "stomatologists" in many countries. However, the creation of dental schools separated from medicine began in the USA in the nineteenth century. This is to be the first step leading for the dissociation of oral health to general health. The professional era of dentistry thus begins in 1839–1840 with the founding of the first school of Dentistry, Baltimore College of Dental Surgery in Baltimore, USA by Horace Hayden and Chapin Harris, who established the Doctor of Dental Surgery (DDS) degree. The school merged with the University of Maryland in 1923.

In addition, at about this time, the world's first national dental organisation was founded: American Society of Dental Surgeons (the organisation dissolved in 1856) and the first scientific journal: The American Journal of Dental Science, began. The dissemination of knowledge began to have certain norms that were the first attempts to ensure the reproducibility of published observations and this was an important advance in the formalisation of dental studies.

In this historical period, anaesthesia was discovered. The first to use it was a dentist, Dr. Horace Wells, who in 1844 started promoting its use for the mitigation of pain, testing its effect on himself. The anaesthetic properties of nitrogen protoxide or "laughing gas" were discovered by Priestley in 1776. However, it was only in 1844 that Wells used it clinically. Later, in 1846, another dentist, Morton, revolutionised the medical world again, using ether.

In 1806, William Colgate opened a starch, soap and candle factory in New York, but it was not until 1873, 16 years after his death, that the company started selling mass-produced toothpaste in jars. It would take another 19 years for it to be sold in tubes, when Dr. Washington Sheffield of Connecticut, US, came up with the idea. Dr. Sheffield's inspiration came from the paint tubes of Parisian artists, and he began marketing his idea in 1892 as "Dr. Sheffield's Creme Dentifrice".

Our understanding of caries aetiology changed with Miller's "Microorganisms of the human mouth" from 1890 and when in 1908 Greene Vardiman Black, who is

considered the father of modern dentistry, published his two big volumes on "Operative Dentistry", which deal with the aetiology and treatments of dental caries. This textbook influenced generations of dentists, mainly because it laid the foundation for the rehabilitation of decayed teeth. Black's influence has dominated restorative dental care up to now, but it is noteworthy that many of his recommendations have been neglected while his statement "extension for prevention" gained much support, not least after the introduction of the air rotor (in 1957). With this development, the last half century became the era of restorative dentistry.

The idea of adjusting the fluoride content in drinking water after 1940–1945 was the result of systematic clinical studies where Trendley Dean and colleagues first confirmed animal studies showing the direct relationship between fluoride ingestion and "mottled enamel"—dental fluorosis—and subsequently discovered the inverse relationship between fluoride concentrations in natural waters and dental caries. Dean's excellent epidemiological studies resulted in the introduction of artificial fluoridation of water supplies for caries prevention in the USA.

Gold and amalgam have played large roles in the history of dentistry. Amalgam was first used for dental purposes in 1833 and in Britain a vigorous debate went on through most of the nineteenth century on the safety of amalgam. This period saw the use of vulcanite for dentures (1839) and gold foil for cavities (1855), the foot-treadle dental engine and the first electrical dental engine in 1871, and in 1886, just 14 days after the discovery of X-rays by Wilhelm Roentgen, that Friedrich Otto Walkhoff took the first dental radiograph (Gensman 1982). Edward Hartley Angle, who classified the various forms of malocclusion, is credited with turning orthodontics into a dental specialty. Angle also established the first school of orthodontics (Angle School of Orthodontia in St. Louis 1900) and the first dental specialty journal (Tuncay 2001).

Early in the twentieth century (1910), the first formal training programme for dental nurses was established in USA. In the same year, dental hygienists were introduced. Later, the poor dental health of school children in New Zealand prompted the introduction in 1921 of the world's first School Dental Service (SDS). The SDS was staffed entirely by female dental nurses. Recruitment of the dental nurses began in 1921 and the first cohort graduated in mid-1923. In the 1980s, dental nurses became dental therapists, and in the era of operative dentistry the profession tried to cure dental caries by drilling and filling.

By the middle of the twentieth century, dentistry had become well established as a technical expertise where the dentist could perform delicate operative procedures in the oral cavity. The focus shifted from the surgical to the restorative, which allowed restoring damaged teeth, with the aim of keeping the teeth functioning in the mouth. The central philosophy of dentistry was to restore teeth (Ettinger and Beck 1982; Ettinger 1992). This emphasis on restoration was possible due to a number of technological and scientific advances. These advancements allowed for fast and relatively painless treatment of a wider range of dental problems.

While local dental anaesthetics were first introduced in the early twentieth century, this was commonly used in dentistry from the 1940s (Ettinger and Beck 1982). Disposable needles for dental use were introduced in 1959 (Glenner 2000).

The air rotor technique appeared in the first half of the twentieth century (1957). The new high speed air rotor allowed dentists to cut cavities in teeth and make "extension for prevention" type of cavities—apparently without appreciating that once a tooth is cut and a restoration placed, such restorations are doomed to be replaced and a vicious cycle of replacement of fillings and further extension of cavities was the inevitable result (Elderton 1990, 1993, 2003). These procedures weakened the teeth and often caused irreversible pulp damage and tooth loss.

The development of endodontic techniques around this time aimed to keep the teeth in the mouth even after they had lost their vitality. However, as endodontics grew, so did the need for crown and bridge reconstructions.

As older adults increased in number, the need for restorative dentistry and prosthodontics in all its aspects was so great that in several countries a new cadre was created, the dental technician, who after a short training was allowed to make partial and full dentures.

Other important advances during this "*scientific era*" included the identification of the role of sugar in dental caries from epidemiological and clinical studies, the appreciation of the role of bacteria in dental caries and in periodontal disease, the development of dental adhesion and dental implants. Organic resins, polymers and bonding agents changed dental materials and the ways in which teeth were prepared for conservative restorations.

Composite materials also allowed the development of dental sealants in the 1970s (National Institute of Dental Research 1990). These resulted in a number of public health measures, which lead to great improvement of the oral health of selected individuals. The concept of preventive dentistry, in dental caries and periodontal disease, was acknowledged in the late 1960s and early 1970s. Since then, such orientations have become more accepted in the dental profession and now represent the prevailing professional philosophy (Ettinger 1992).

Preventive dentistry originates from the appreciation of the preventive and therapeutic effect of fluoride when given both systemically and more and more topically applied, in particular, in toothpastes. Probably, the most important factor in caries prevention in the USA has been the use of water fluoridation (Fejerskov et al. 2015). In 1945, the city of Grand Rapids had its water supplies adjusted to a fluoride content slightly above 1 ppm F—as a result of Dean's research, as mentioned above. The early results showed an almost 50% reduction in DMFT in 12 year olds, but in the early 1990s the difference between populations exposed to water fluoridation and non-fluoridated communities in the USA was on average 17% (Brunelle and Carlos 1990). Since the end of World War II, water fluoridation has been introduced in several countries around the world. In Europe, this is only in UK and Ireland whereas Holland and Finland terminated attempts to use this measure. Some countries in Latin America and two in Europe have introduced salt fluoridation but according to the systematic Cochrane reviews (http://www.thecochranelibrary.com) the quality of scientific evidence for caries reduction was variable and poor, with estimates of effectiveness based mainly on data from studies without a concurrent control group. In the 1960s, fluoride was added to toothpastes which have become the most widespread fluoride preventive measure as it combines regular, daily availability

of fluoride in the oral cavity with oral hygiene resulting in concomitant interference of the dental biofilms. Moreover, fluoride is added to a variety of other dental products which can be used either on an individual basis by the population or, depending on concentration of fluoride added, may be applied by dental professionals.

In 1999, fluoridation of drinking water was chosen as one of the ten most successful major public health measures in medicine, along with vaccines, infectious disease control and family planning, among others (Centers for Disease Control and Prevention 1999).

As a consequence of the historical advancement of the dental professions, in the 1950s/1960s, dental schools comprised mainly departments of Operative Dentistry, Prosthodontics, Oral surgery, Dental materials and Orthodontics. Operative Dentistry became divided into Pedodontics, Periodontology, Endodontics and in some places Gerodontology and Special Needs dentistry. In other words, special attention was brought to oral health in children, adults and elderly, partly ignoring that the diseases were the same for all age groups.

During the last decades of the twentieth century, research and technological advances changed the clinical practice of dentistry. Dental implants based on the principles of osseointegration grew extensively around the world, amongst those who could afford such treatment. The integration of CAD/CAM systems allowed for more accurate and less time-consuming restorations. The use of digital 3D diagnostic tools achieved greater precision and treatment planning. Nonetheless, these techniques are refinements of a technological approach to solving the results of tooth loss, i.e. a further focus on repair and restoration and oral rehabilitation, combined with a component of minor oral surgery.

Today, in most parts of the world, the dental profession is organised in very similar manners in most industrialised countries (e.g. Great Britain, Scandinavia, Holland, France, USA, etc.). Oral health care for adults is commonly provided in numerous small private clinics, typically concentrated in the cities. Depending on the socio-demographic profile of the different populations, the majority of clinical practices comprise restorative dentistry, cosmetic dentistry, crown and bridge work and removable dentures or implants, where the population can afford these more expensive treatments.

In several countries, preschool and school children are offered a public dental health service in schools (with some focus on caries prevention but predominantly caries operative procedures) and in these age groups in particular orthodontics has become very popular. It is remarkable, however, that today in some countries private practicing orthodontists are performing extensive treatments in adults for cosmetic reasons, mainly, among the well-off fractions of the populations. It is noteworthy that from an oral health point of view this does not lead to better oral health in the population.

In some countries, the dentist and the dental assistant are the only professionals providing oral health care. General dental practitioners commonly operate a “solo cottage practice model” (DePaola and Slavkin 2004). In addition to this model, the second part of the twentieth century saw the creation of a series of sub-specialities

within dentistry (e.g. Oral Surgery and Orthodontics, Paediatric dentistry, Endodontics, Periodontics, Crown and Bridge Prosthodontics, Implantology, etc.), claiming that this was a way to improve the oral health care in populations. Nonetheless, the growth of specialities does not necessarily enhance the quality of oral health care in populations. Rather it can gradually lead to a lack of communication between the various sub-disciplines, professional competition between specialities and attempts to favour one discipline over another (Cohen et al. 2017).

We have not described the role of periodontal diseases, developmental anomalies, oral mucosal and osseous diseases in oral health, because it remains a fact that dental caries and its sequelae—pain, failed restorations, tooth loss and edentulousness—have been estimated to account for 93–98% of the oral disease burden across the different regions of the world (Murray and Lopez 1996). So, all available evidence indicates that irrespective of how many traditionally trained dentists we produce and how many sub-specialists we create within the small discipline of general health designated "dentistry" or "odontology", we do not seem to influence the prevalence of oral diseases worldwide except for a few Nordic countries.

Oral health is an integral part of general health. As long as we consider dentists to be members of a separate profession which is not seen as a medically trained colleague by the general medical profession, we will not truly become integrated in the health sector at large! Just to give an example from Denmark: even top trained dentists in oro-facial pain, oral surgery, etc. are not allowed to perform local anaesthesia percutaneously without a medical doctor being responsible. So, many argue that the time has come to reconsider the oral health care system and its organisation within the framework of general health care in all countries (Fejerskov et al. 2013).

On the other hand, in the last part of the twentieth century, there was a realisation that major inequalities in oral health still existed both within and between countries in terms of disease severity and prevalence (Sgan-Cohen et al. 2013). These inequities are the result of a complex interplay between social, psychological, behavioural and biological processes. According to Williams and collaborators (2012), this is in large part due to a failure to implement the profound and vast knowledge of oral diseases, and more importantly their prevention. Significantly, this also reflects a failure to understand the social determinants of oral diseases and a reliance on activities that oral health practitioners can deliver to patients.

1.3 Future of Oral Health Professions

There are four worldwide megatrends that have the potential to greatly influence how oral health care is conceptualised, and organised, how we train oral health care personnel, and how they will deliver health services to the population. First is the pervasive use of information and communication technologies (ICT) in our daily life. The second trend is world globalisation and migratory movements, and the third is the ageing of the world population. The fourth megatrend is climate change. Each of these can potentially modify how dentistry is practiced in the future.

We know today that dental caries can be controlled very cost-effectively (Fejerskov et al. 2015; Kidd and Fejerskov 2016) by oral health personnel who do not require long university training. Therefore, it would be possible to maintain a functional dentition lifelong for most individuals (Fejerskov et al. 2013), which in turn should significantly reduce the number of the traditionally trained restorative dentists. The money saved could instead be spent on creating a new type of oral health care professional (OHCP). The OHCP should be competent and skilled not only in the diagnosis, simple treatments and control of oral diseases, but equally importantly, in public health, with a strong theoretical base for upstream, social determinants and shared risk factor approaches to health, basic health economics, management and communication. Such personnel should lead larger teams of health care workers (dental auxiliaries, dental hygienists or nurses, etc.) who operate at community and regional levels, focussing on disease control.

In the foreseeable future, with a changing demographic profile in most populations, there is a need for health professionals who are highly skilled in performing complex, technically based, oral rehabilitation procedures and who should be trained in individual diagnosis and treatment of pathologies in the oral cavity and head and neck regions. Most elderly patients suffer from complex diseases (diabetes, arthritis, cancers, respiratory diseases, etc.) and receive various medications. Some of those who, for various reasons, require advanced oral rehabilitation or oral surgery should be referred to special regional clinics/hospitals by an OHCP. In order to integrate oral health into general health, it might be appropriate to aim at medically trained Oral Surgery and Medicine specialists as well as Oral Rehabilitation specialists, so-called oral clinical specialists (OCS) who work integrated with other medical specialists. The role of the OCS should be compared with having an ear, nose and throat specialisation within medicine.

With the rapid change in demography of most high-income countries we are seeing a rapid growth in the number of older adults who suffer from complex systemic and metabolic diseases which require sophisticated medical and pharmaceutical monitoring as part of any technical or surgical intervention. Therefore, what we in the past designated "dentists" might preferably be transformed into OCS and be trained basically as a medical doctor and as such be an integrated health care person on equal terms with the other medically trained specialists. Such a restructuring of oral health care would provide better oral health to everyone in a population through disease control and easy access to health care. The outcome would be future populations who maintain functional dentitions lifelong.

The total societal cost for training and provision of disease control should not increase. In this recommendation, we are not considering the variety of cosmetic procedures which do not improve oral health. Such treatments do not require academically trained persons. Oral health personnel should not be involved in cosmetics.

New research is providing evidence of the profound relationship and interaction between general health and oral health. For example, the diagnostic potential of saliva is emerging in the detection of diseases such as cancers (e.g. pancreatic cancer) and diabetes. Additionally, the development of genetic engineering is

opening up new possibilities for treatment to recover the tissues lost by disease, trauma or surgery or even the prevention of a life-threatening condition. So integration and interaction between a variety of disciplines is emerging.

These and other developments of ICT and along with it artificial intelligence (AI), robotics, the Internet, self-learning machines or the need to analyse large amounts of data will require different oral health professionals with different skills and specialisations. This paradigm shift would suggest that some tasks will be carried out by AI systems, robots or may not even be needed anymore. Rather, data scientists with skills in math programming, statistics and data analytics will be required. These health professionals may well be our current students who already need to have new knowledge and skills. They should also be able to communicate with developers, designers, linguists, programmers, engineers or psychologists, with the expertise to understand human behaviours and sociological phenomena to meet the health demands of their community and provide advice to people to adopt healthy behaviours and avoid unhealthy ones. These reflections are in full accord with the proposals above. Dental schools as we know them are not likely to provide the vibrant and dynamic environments needed to adapt to these complex societal changes in the health sector.

However, the biggest challenge for the profession is the change in focus from oral pathologies, from a microbiology and clinical approach, to an approach based on the social aspects associated with the health of individuals. What is required if we move from a model of relatively simple infectious diseases to a model of complex chronic diseases? Many factors interact, most of which require professionals who are trained to serve as members, leaders and consultants of health/non-health teams and are able to work with the assistance of other professionals, such as psychologists, social workers and health educators (Mariño et al. 2016).

The major role of these professionals should be to set health priorities at the community level for all age groups and lead teams of oral health care workers of different types. The OHCP's together with their staff of oral health care workers would in a cost-effective manner be gatekeepers with respect to advanced oral health care services integrated into the general health care system in the countries/regions they serve. The goal should be that oral health care should not take a bigger share of the total health budget—but the outcome should be populations who maintain functional dentition for life and receive high quality oral rehabilitation when needed.

Another challenge for oral health care is how to deliver treatments and preventive interventions, particularly for the most vulnerable populations. These include older adults with systemic conditions, poly-medicated individuals, those with limited mobility and capacity to perform daily oral hygiene practices, those who cannot access oral health care services or those with medical conditions that affect their oral health. Opportunities for changes to preventive and disease control approaches range from upstream, midstream and downstream strategies (Watt 2007).

As indicated before, the transmission of knowledge in dentistry through peer-reviewed textbooks and scientific journals began in the mid-1800s, and as the amount of information available began to increase, this scientific information was not readily translated into information that could be used for multiple audiences.

There were two main problems preventing this translation: the exponential growth of knowledge and how to access that information. These days, the WWW functions as a point of expeditious access to biomedical information, resources and databases. Methods of sharing information are increasing with open access journals and digital libraries. Traditional methods to disseminate information will be further complemented by social media. Still, to be able to practice dentistry, professionals rely on continuous updates of the body of information that is developed in laboratories, clinical and community trials, etc. This is an impossible situation, and the WWW is hampered by an ever increasing amount of postulates, pseudoscientific evidence and lately so-called fake news. However, if anyone wanted to read everything published about dental caries in 2015, they would need to read eight articles daily for a year; the knowledge society in which we until recently had great trust in might be turning into a knowledge swamp.

The ability to stay up-to-date with current knowledge, to assess the quality and relevance of select information (i.e. learning to learn), is a critical skill. Evidence-based dentistry seeks to close the gap between research and clinical practice (Richards and Lawrence 1995). This is possible because today we have studies that allow us to synthesise the result of the research, a methodology called "systematic review". By 2016, the Oral Health Group of the Cochrane Collaboration had published more than 150 systematic reviews, while in Medline/Pubmed there are over 2300 systematic reviews available (Cochrane Collaboration 2017).

1.4 Conclusion

Oral diseases are as old as mankind; we know that 5000 years ago people tried to drill teeth.

The inclusion of historical landmarks in this chapter allows us to understand the path of the creation of a dental profession, as traced by many researchers and scholars of human health. Most likely relief from pain derived from the teeth has been the background for a gradual development of particular people in many cultures who could extract teeth, hence dentistry emerged as a surgical speciality. Specialised dental schools were created more than 150 years ago and biological and technological developments have enabled the restoration of teeth and creation of removable dentures, changing the profession into a technological discipline able to operate in the mouth rather than just extracting damaged teeth.

During the last half of the twentieth century, research and technology has advanced to change the clinical practice of dentistry to become safer, less invasive, increasingly painless and comfortable for the patient. However, the role of the dentist has focused on dental restorations and prosthodontics. With age, most individuals loose many teeth and about half of the population is edentulous by the age of 60–70 years. At this moment in history, we have, however, come to appreciate that most oral diseases can be controlled, and as caries and periodontal disease cumulates with age it is possible to influence further disease progression by adopting the concept of caries control. Hence, most people can maintain functional natural

dentition for life. To further strengthen this development, in the future, oral health care must be integrated into general health care and the training of traditional dentists must be reconsidered concomitant with growth in the number of dental auxiliaries to be responsible for disease control in all age groups.

This development necessitates a reorganisation of oral health care. In most populations, the number of elderly is rapidly growing and many of them suffer from complex systemic diseases requiring multiple medications. Today, throughout the industrial countries of the world, people increasingly live longer. The quality of oral health care has advanced, especially during the last half of the twentieth century, and more people have more remaining teeth as they reach the eighth decade of life than ever before.

Despite our justified reasons to celebrate these accomplishments in oral health care, all too many people have been left behind with respect to the prevalence of diseases, including oral health diseases and disorders. Today, we acknowledge that a variety of socioeconomic determinants control morbidity and mortality.

We need to "put the mouth back into the rest of the body." This means that the training of modern oral health care personnel at our universities needs to be reconfigured and we need to eliminate silos and create interdisciplinary or trans-professional learning environments. We need to engage in interdisciplinary team approaches. The dental profession can no longer stand alone without the risk of gradually being marginalised in the health sector of most societies Thus, we are facing an enormous challenge because society is changing so rapidly—and so are the oral health needs of populations. But we have the capacity to control, in a cost-effective manner, the major oral diseases, so let us—and not others—adjust the structure of the profession to provide the most cost-effective oral health care to address the oral health needs of populations.

1.5 A Personal Journey into the Oral Health Profession: Ole Fejerskov

It is my belief, after five decades in the dental profession, former Dean of a dental school for 8 years and until recently as the head of a university medical anatomy department, that the profession has somewhat lost its way. We have marginalised our role in the total health care system. Driven by professional self-esteem, we have worked to maintain dentistry as independent of the medical profession. But we must ask ourselves as a profession whether we are failing to take a more critical overview of the health care system and whether we are in fact serving the oral health needs of the population—or the needs of the dental profession?

International associations are well aware of this challenge (Hobdell et al. 2003), but when it comes to possible solutions they seem to be stuck on the idea that traditionally trained dentists should just receive further postgraduate education and remain as those heading dental teams. I would argue that this will not lead to better integration of dental care with general health care and that we are failing to train

dentists in managing and supervising teams to deliver effective oral disease control in populations.

As we have stressed above, dental caries and its sequelae are totally dominating dentistry around the world, along with a growing focus on cosmetic procedures and methods. But we have been largely unsuccessful in reducing the prevalence of the predominant oral diseases. In several countries around the world, we are seeing a dramatic increase in the number of restorative dentists who do not address the need for oral health care in the population. The reality is that oral health conditions remain unchanged in the population at large and traditional dentists are concentrated in urban areas. I argue that the ethos and philosophy of dentistry are too focused on downstream, patient-centred, curative and rehabilitative approaches to oral diseases (Baelum 2011).

As a profession, we should be asking both why this has happened and whether we should continue with the traditional model of dental training operating in dental schools world-wide. The current premise seems to be that fully trained dentists, in addition to being trained in restorative care, should also know about molecular biology, genomics, proteomics, metabolomics, etc. (Hobson 2009) and should operate in small practices. But this contradicts the 2020 Global Oral Health Objectives as presented by the World Dental Federation (FDI) (Hobdell et al. 2003).

Dental students have a solid biological foundation, but the "real study" starts when they enter the clinical years. Most departments are staffed by part-time dentists from private clinics who supervise and control how many fillings, crowns, etc. are being produced. The net result is that students are given the strong message that what matters most is clinical technical procedures and experience. Hence dentistry is maintained in the old frame of a technically skilled profession focused on making fillings, crowns, bridges, dentures and implants. The question of determining the oral health needs of the population we are serving disappears in the profession's ethos.

I argue that dentists who are being primarily trained to intervene using air rotors, composites, metals, ceramics and implants will be driven to market and sell expensive trinkets to people with dentitions that are marginally less than perfect (Renshaw 2005). In fact, I conclude that restorative approaches tend to work against improvements in oral health. To cite Renshaw (2005), "one of our problems as a profession over the years has been our reluctance to look honestly in the mirror long enough and often enough to see what we are doing and what we have become". These thoughts have been further elaborated in the so-called La Cascada Declaration at https://lacascada.pressbooks.com/front-matter/introduction/ and https://lacascada.pressbooks.com/front-matter/preface-the-dental-profession-in-the-21st-century-a-proud-past-questionable-present-and-achallenging-future/.

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Licensing, Regulation, and International Movement of Oral Health Professionals (OHPs)

2

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Abstract

Oral health practice is subject to specific laws and regulations. Clinicians need to be aware of a range of issues involving malpractice and complaints that impact on operations and the provision of health services to their patients. This chapter presents an overview of some of the licensing and regulatory practices for Oral Health Professionals (OHPs) around the world, including some specific examples from Australia and Chile, as case studies. The chapter also provides an overview of major areas of the law from a global perspective, with attention to oral health. The primary objective of these laws and regulations is the protection of the health and safety of the public. As the political and socio-demographic framework or conditions change, these guidelines, laws, and regulations should also evolve, but must continue to ensure high standards of safety in health service delivery.

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2.1 Introduction

Oral health is an integral part of general health and, undoubtedly, a major aspect of the health policy framework of any country. Untreated dental caries, periodontal disease, and tooth loss rank among the most prevalent conditions in the global burden of disease study (Marcenes et al. 2013). Several oral diseases are also linked to other systematic conditions such as cardiovascular diseases. It is estimated that the direct treatment costs for oral diseases alone are about US$298 billion globally, corresponding to an average of 4.7% of the global health expenditure (Listl et al. 2015). While oral health problems are rarely a matter of life and death, the importance of oral health is based upon its clear role in social, economic, and psychological quality of life. In this way, the impact of dentistry on human life could be greater than anticipated.

Oral health professionals (OHPs) are responsible for the health and well-being of the mouth and adjacent structures. As discussed in this book (See Chaps. 3 and 6), there are several types of OHPs: dental surgeons and dental specialists, oral health therapists/dental therapists oral hygienists, dental technicians, etc. Although the requirements of different jurisdictions may vary, all OHPs are required to obtain a "license to practice," which offers them the legal authority to practice oral health care within their confined jurisdiction.

There exist considerable variations in the licensing and regulatory practices across countries, and in some cases even within a country (e.g., United States). In addition, OHPs need to be aware of the various regulations (and regulators) that define their scope of practice and broadly monitor their practice activity, mainly to protect the public from harm perpetrated by incompetent dental professionals. These differences increase the complexity of issues, specifically in the context of a globalizing world, in which it is not unusual for OHPs to migrate (temporarily or permanently) for training or work to different countries (Balasubramanian et al. 2015a).

In this chapter, we provide an overview of licensing and regulatory practices for OHPs with the objective of creating a comparative view of different approaches and exploring how globalization is affecting those policies and legislations. The chapter begins with a general discussion on the global oral health workforce, with recent data mostly from the WHO Global Health Observatory. It discusses oral health professionals' licensing and regulatory practices and offers some insights on the dentist migration issue. Finally, we provide more specific examples across the world with two country case studies (Australia and Chile) and discuss some of these issues from a cross-country perspective.

The authors of this chapter have considerable international experience in the area of OHP's licensing and regulation, to provide a global overview of various practices across the main regions of the world.

2.2 Global Oral Health Professional (OHP) Workforce

Globally, it is estimated that there are around 2 million OHPs, about 80% of them dental surgeons (World Health Organization 2017). The largest proportion of the OHP workforce (46%) is based in the WHO American Region. In fact, nearly a quarter of all dentists in the world are based in Brazil or United States alone; Brazil also accounts for about 250,000 dentists and has the largest dentist population in the world (World Health Organization 2017). About 23% of the global OHP workforce is in the WHO European Region, and the WHO South East Region and Western Pacific Region account for about 11% and 12% of all OHPs across the world, respectively. There is a substantial scarcity of dentists in the African Region; only about 1% of OHPs are based in this region, and in about 40 countries there are less than five dentists per 100,000 people (Chen et al. 2004; World Health Organization 2017). In the same manner, Pacific Islander countries also have some of the lowest dentists to population ratios in the world (Doherty et al. 2010).

The distribution of OHPs is in sharp contrast with the distribution of the world's population and highlights the imbalance in human resources to provide oral health care. At the extreme level, the scarcity of dentists has limited the provision of dental care to emergency services such as pain relief and tooth extraction (Kandelman et al. 2012).

Many countries have dramatically increased the supply of OHPs, mostly dentists, through a proliferation in the number of dental schools that educate or train them (Balasubramanian et al. 2016). For example, the number of dental schools in India grew from 145 in 2002 to 294 in 2012 (Dental Council of India 2012) and in Chile from five dental schools in 1997 to 39 in 2016 (Cartes-Velazquez 2013; Alcota et al. 2016). In Australia, among the measures taken to alleviate the undersupply of oral health professionals and improve the capacity to provide oral health care services, several new dental schools have been established to train OHPs, in addition to the five long established dental schools in the country (Australian Research Centre for Population Oral Health 2008).

Some countries such as the Philippines have started training health professionals (including dentists) for an international market (Ortiga 2014; Balasubramanian et al. 2015a). The migration and recruitment of overseas-qualified OHPs has also been encouraged (Balasubramanian et al. 2015a). In fact, in Australia, until recently, dentistry was one of the professions and occupations given priority immigration. According to the FDI World Dental Federation, Australia has the largest proportion of overseas dentists amongst the Organisation of Economic Cooperation and Development (OECD) countries (OECD 2007; FDI World Dental Federation 2009; Benzian et al. 2010).

However, despite this growth in OHPs graduates every year, several countries still face significant maldistributions of human resources, with scarcity of oral health professionals in the rural areas and villages. For example, nearly 80% of dentists in Australia practice in major cities, where 70% of the Australian population is

concentrated (Australian Bureau of Statistics 2012; Australian Institute of Health and Welfare 2013). Only about 1% of dentists practice in the remote or very remote areas, where there are about 22 FTE dentists[1] per 100,000 people compared to a national average of 57 FTE dentists per 100,000 people (Australian Institute of Health and Welfare 2014). In addition, several countries face significant maldistribution of oral health care personnel by sector of practice (i.e., private vs. public) (World Health Organization 2012; Al-Harthi et al. 2013). For example, in Jordan, nearly 90% of all dentists practice in the private sector (World Health Organization 2012). In Australia, 83% of the employed dentist workforce work in private practices and only about 15% of dentists are employed in public-service dental facilities (Australian Institute of Health and Welfare 2013). A similar situation is reported in Chile, where 23% of the dental workforce works in the public sector, whose beneficiaries are 76.5% of the country's population (Alcota et al. 2016).

Clearly, increases in the number of OHPs, whether achieved by direct action, as in Australia, or because of deregulation of higher education, would be desirable; however, by itself this is not likely to address all maldistribution issues, in terms of both geographic and sector of practice. Furthermore, a health system may not be able to generate sufficient job opportunities in both the public and private oral health sectors, thus creating a complex occupational scenario (i.e., underemployment or working outside oral health) (Alcota et al. 2016).

2.3 OHPs Licensing and Regulation: An Introductory Framework

Licensing and regulation of OHPs is a complex issue, and several organizations (or) groups are involved in the process of setting registration standards, codes, policies, and guidelines that regulate oral health care practices. Figure 2.1 provides an introductory framework (and a working model) to understand the three environment levels of dental licensure and regulation.

The theoretical model (Fig. 2.1) adopted has four main components within three levels: Level 1 includes the OHPs' education/training and the practice environment. This education/training level includes the dental schools and training organizations providing education and training. The practice environment includes both a public and a private sector, where qualified OHPs choose to practice. Level 2 includes the regulatory environment, where regulatory organizations accredit dental schools and dental programs, assess graduating dentists, provide dental/allied dental licenses, and monitor the quality and standards of both the education and practice environment. Level 3 provides the specific context, as it includes the professions, public and

[1]FTE or Full Time Equivalent dentists is calculated based on total weekly hours worked. FTE number is calculated by the total number of weekly hours worked by employed dentists divided by the standard working week hours.

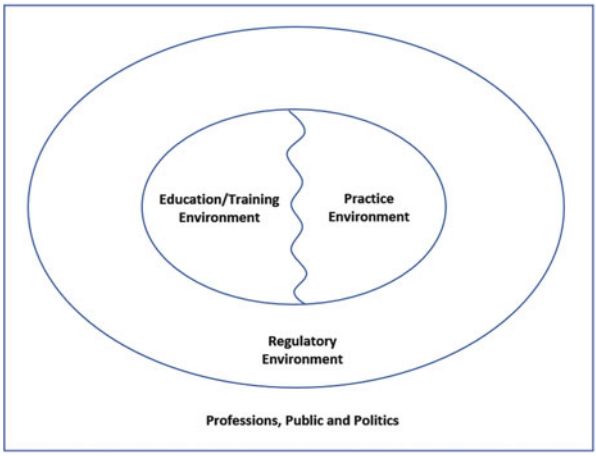

Fig. 2.1 Dental licensure and regulation environments—a three-level working model

political environment, which has the capacity to influence both the regulatory and education/training and practice environments.

The process of obtaining a license to practice generally requires completion of an oral health profession education program from a dental institution/school. The training standards of dental schools and other institutions offering dental programs are assessed by regulatory bodies, who also accredit dental schools and new dental programs. However, while in some jurisdictions these institutions have gone through a thorough accreditation process, in others, although the regulation of professions and degrees is established, including a set professional educational standards, not all institutions conferring oral health degrees have gone through this process. Limited regulation in terms of accreditation may question the quality of those institutions (Alcota et al. 2016; Mariño et al. 2016).

Graduating OHPs moving from an education/training environment to a practice environment (to work in public or private sector) are required to pass through the necessary regulatory body. Examples of such regulatory bodies include the Dental Board of Australia and State Licensure Boards in the United States. Professional organizations both national (such as the American Dental Association) and international (FDI World Dental Federation) represent the dental profession and strongly advocate for professional interests. The requirements for eligibility to practice dentistry vary and in some jurisdictions, oral health graduates are automatically registered with the government and there is no second examination to pass.

A society makes an important investment in training oral health professionals, and there is an expectation and a responsibility to demonstrate a return for that investment. The regulatory system involved must ensure that graduates achieve good standards and that they will continue improving their training throughout their professional life, and that whatever they do is evidence-based best practice. However, accreditation based on administrative issues and not on quality may not meet this objective.

Even in countries with no compulsory accreditation of oral health professions training, there are calls for the implementation of measures that will ensure the quality of the training of oral health professions' graduates and to regulate the growth of the number of graduates of the professions (Alcota et al. 2016). After ensuring that institutions meet minimum quality standards, the next stage would be to test for specific competency levels through some sort of compulsory National Oral Health Examination for all graduates (Alcota et al. 2016).

Several other professional and research groups (internationally such as International Association for Dental Research, International Federation of Dental Educators and Associations, or nationally such as Dental Industry associations) also have a role in providing evidence or raising concerns on the regulatory or education and practice environments. The public can also influence the education/training and practice environment and regulatory environment levels, through raising quality issues, or concerns about the lack of necessary care provision services (Mariño 1993). Political organizations can also undoubtedly influence OHP regulation. The key points would be to ensure that the steps taken towards registration and accreditation operate smoothly and serve the aims of providing high standards of oral health care service delivery, as well as producing excellent OHPs.

2.4 International Migration of Dentists: An Emerging Phenomenon

OHPs, due to a variety of reasons, are likely to migrate and work in places different to their country of birth or country of primary dental training (licensure) (Balasubramanian et al. 2015a, b). Nonetheless, apart from clearing immigration procedures, all overseas-qualified OHPs wanting to practice in the receiving country must meet some specific local requirements, which in most cases, apart from language requirements, are consistent with those of local graduating OHPs.

In some cases, cross-border recognition of qualifications happens bilaterally between two countries. Proximity towards underlying culture between countries, historical relations, broader trade agreements, and regional cooperation in many ways facilitates these bilateral arrangements. For example, the Trans-Tasman agreement between Australia and New Zealand facilitates the mutual recognition of Australian OHPs in New Zealand and vice versa (Hawthorne 2012). Another example is the Andres Bello agreement in Latin America which automatically validates dental degrees between Colombia, Ecuador, and Chile (Hartmann 2008). In addition, bilateral agreements have been signed by Chile, Brazil, and Argentina.

There is also the example of "regional hubs" where a group of countries come together to participate in regional cooperation, facilitating the free movement of labor and possible recognition of dental qualifications across the countries in the region. A good example of a regional hub is the European Union (EU)—"a unique economic partnership between 28 European countries that facilitates EU nationals to work for any employer or as a self-employed person in any EU country without needing a work permit" (European Union 2015a). Dental qualifications obtained in

any EU country will be recognized for practice across the EU countries (European Union 2015b), facilitating free movement of dentists, and arguably also facilitating a more dynamic dentist registration, licensing, and regulatory system.

In France, there was the unique example of a Portuguese Dental Faculty located in the South of France (De Queiroz 2014; Ané 2016). Because in France there are numerous requirements for graduating as a dentist in a public university (or a medical doctor or pharmacist), many young people who fail to achieve this consider other European countries to get their degree. The University of Fernando Pessoa proposed a Portuguese Diploma of Dentistry on French territory. However, this experiment led to a major strike by French dentists and dental students and the private dental faculty had to close in September 2016 after only 3 years.

Even if every European dentist could work in any country in the European Union, it seems to be not well accepted by many stakeholders.

Similar examples (but at a more preliminary stage) can be seen across the Association of South-East Asian Nations (ASEAN), Latin-America (MERCOSUR), and also the Gulf Cooperative Council (GCC) countries (Gulf Cooperative Council 2013; Association of South East Asian Nations 2015; MERCUSUR 2017). It is possible and also probable that in future regional cooperation will be strengthened by a unified health professional accreditation, licensing, and regulation system. While these systems will undoubtedly strengthen economic development and improve the flow of knowledge across borders, they would have to pass through multiple stakeholders (some with different organizational, national, regional, and global interests).

However, migration of professionals contributes to brain drain and affects the country of origin's ability to meet adequate oral health workforce requirements (Balasubramanian and Short 2011a, b). It could also be argued that professionals' migration represents a misuse of tax payers' money, as the source countries lose their educational investment made on the migrating OHPs. Additionally, migration of professionals to a new country might restrict opportunities for school leavers and locally practising OHPs (Australian Dental Association 2012a, b).

Thus, the arrival of foreign-trained OHPs is a new manifestation of the professionals' migration phenomenon and is expected to have a considerable impact on workforce planning and development of the receiving country, as previously described (Alcota et al. 2016). The migration of OHPs into a new country is an emerging policy issue for both the receiving country as well as the source countries that lose these professionals.

While overseas dentist licensure and recruitment practices can serve as a means to fulfil the immediate demand for oral health care, and possibly offer more support in areas of need, there are ethical issues in the sustainability of such models. It is also necessary to address the concerns and complex interests of multiple stakeholders: those of employers, locally trained and migrant OHPs, professional organizations, the general public, regional, national, and provincial governments and international organizations, such as the WHO and World Federation of Dental Associations. Furthermore, over the last decade the number of health professionals migrating from the developing and poorer regions of the world has considerably increased

(Watkins and ADC 2011; Hawthorne 2012). To address this, a Global Code of Practice on International Recruitment of Health Personnel was developed by the WHO in 2010. The Code provides a set of principles and practices for the ethical international recruitment of health personnel and for health workforce development (World Health Organization 2015).

2.5 Licensing and Regulation of Oral Health Professionals in Australia and Chile

In this section, two case studies (Australia and Chile) are provided as we look with a cross-country lens at how these countries, with their varied cultural and historical conditions, have addressed licensing and regulation issues. Each aspect will be discussed using the four main components present in our theoretical model (see Fig. 2.1). In doing so, it will be necessary to first describe some basic historical, political, and administrative differences, which will be a useful scheme in understanding their unique situation regarding oral health care services delivery. Readers are advised that the levels presented are less rigid, and there is noticeable overlap in our discussion within these levels.

2.5.1 Political and Administrative Characteristics

A basic difference between Australia and Chile is their political administration system; while the first is a federal country the latter has a unitary system. A federal system is one where government powers are divided between a general government and the government of territorial subdivisions, the States. In this system, the national government has limited authority and does not reach the individual citizen directly. On the contrary, in a unitary administrative system, the role of central government is much more active. The delegation of power to regional governments and nongovernmental organizations is rendered by governmental rules and regulations. Thus, the central government can intervene in the economy, education, social security, welfare, and public health of the population without the means of any territorial distribution of power.

2.5.2 The Oral Health Care Practice Environment

Oral health care in Australia, as in most countries in the world, has traditionally been provided by dentists working in private clinics (Spencer et al. 2003). Public dental services are provided by teaching dental hospitals, schools, and community dental clinics (Australian Institute of Health and Welfare 2010). Oral health care services are not covered under the Universal Health Insurance scheme (Medicare) in Australia, and treatment generally incurs out-of-pocket payment, unless the patient is covered by private health insurance (Harford and Spencer 2004). However,

children under 18 years are eligible for free public dental services. Different to the medical services covered by Medicare, which have established fees and rates, there are no regulated fees for services rendered by dentists or other oral health professionals. This means each dentist can charge for his/her services as he/she pleases, often determined by market forces. The private oral health care sector in Australia is the largest employer of dentists (Balasubramanian and Teusner 2011). The private sector mainly includes solo practices or group practices (Balasubramanian and Teusner 2011). Public dental services are mainly run by the State/Territory Health Departments (National Advisory Council on Dental Health 2012).

In Chile, the Public Health system, the "Sistema Nacional de Servicios de Salud" (SNSS) (National System of Health Services), is made up of 29 decentralized Health Services, that cover the entire country, and is responsible for promoting and protecting health and for providing rehabilitative treatment to beneficiaries of the system. Each regional Health Service is under the authority of the Ministry of Health in matters such as policies and norm, but are independent in their budgets and other administrative and technical matters. Although the SNSS gives oral health care services to all the beneficiary population, in its own dental facilities, most of the Chilean population is treated in more traditional oral health private practice. That is, solo private practices with out-of-pocket payment by the patient. Dentistry does not receive economic support from the "Fondo Nacional de Salud" FONASA (National Health Fund), which administers the public funds and social security funds for health, private insurance and direct payment from individuals, through which, the public also gains access to the preferred provider system.

The national government implemented the Explicit Health Guarantee (GES) to ensure that access to health is not related to ability to pay. The system of benefits, guaranteed by law in both the public and private sectors, include comprehensive oral health for those aged 60 years and older, pregnant women, outpatient dental emergencies and comprehensive oral care at 6 years (Superintendencia de Salud 2017).

2.5.3 Oral Health Professionals Education and Training

Currently, there are 12 dental schools in Australia and 39 dental schools in Chile, offering a wide variety of education and training programs for OHPs. These include undergraduate training to qualify as a dental surgeon, as well as speciality training to qualify as a dental specialist. A range of allied dental professional training programs are also offered to qualify as dental hygienist, dental therapist, oral health therapist, or dental technician.

The Australian Dental Council (ADC) is an independent national accreditation authority in Australia that is responsible for implementing accreditation standards, policies, and procedures for the dental program of education and training. The ADC also assesses overseas-trained OHPs seeking registration from the Dental Board of Australia to practice in Australia (Australian Dental Council 2009). The ADC is

registered under the Corporations Act 2001 as a non-for-profit company (Australian Dental Council 2009, 2010). The ADC has a well-established structure; the governing body includes members from dental education providers, peak national bodies for dental professionals, dental specialist education bodies, and dental boards (Australian Dental Council 2009). The recommendations of a recent national review are expected to be incorporated into health practitioner regulation through amendments to the Health Practitioner Regulation National Law Act (National Law). A range of committees and working parties also provide advice and support to the governing board (Australian Dental Council 2009, 2010).

Only about 15% of the dental workforce are employed in public-service dental facilities in Australia. This has been a consistent trend over the last 10 years or more (Spencer et al. 2003; Chrisopoulos and Nguyen 2012).

Health planning in Chile is the responsibility of the Ministry of Health. Regulation of professions and degrees are established in the "Código sanitario" (Health Code) and graduates from medical, dental, and other schools are automatically registered with the government; there is no second examination to pass. This register is available to the public via a database that can be consulted online (Superintendencia de salud 2017).

Until the early 1990s, the training of dental surgeons took place at three dental schools: The University of Chile, The University of Concepción, and the Valparaíso branch of the University of Chile, later converted into the University of Valparaíso. As a whole, the three dental schools' graduates did not exceed 200 per year.

In 1981, the new Law of General Education fundamentally changed the Chilean tertiary education system. Tertiary education was considered an institution governed by the markets and was deregulated. Since then, Chile has seen an accelerated expansion aimed at improving the coverage of young people who enter university. Currently, there are 39 dental training programs at public and private dentistry schools. There is a national accreditation board; however, accreditation is not compulsory, and out of the 39 programs, only 14 are accredited, which reflects the quality of the programs. No standard curriculum exists. For undergraduate training, the accreditation board does not specify core content.

Due to this deregulation, there has been an uncontrolled increase in dentists practicing in Chile ($n = 18{,}155$), which translates as one dentist for every 918 people. WHO Standard is 1 dentist for every 2000 population, giving Chile an over-supply of 117%. Nonetheless, there are only 4200 dentists working in the public sector, which has 76.5% of the population as beneficiaries. Therefore, there is clearly a deficiency of dentists in the public sector.

2.5.4 The Regulatory Environment: OHPs Licensing and Registration

In Australia, all OHPs must maintain a valid registration to practice, from the Australian Health Practitioner Regulation Agency (AHPRA), a national regulating agency for all health practitioners in Australia, including dentists (Australian Health Practitioner Regulation Agency 2013). OHPs are regulated by the AHPRA through the Dental Board of Australia (DBA). Since 2010, the registration of oral health practitioners has been undertaken by a single registration body, the DBA. One of the board's roles is to regulate dental practitioners across Australia under the National Registration and Accreditation Scheme. The DBA also promulgates registration standards, codes, policies, and guidelines to regulate dental practice. However, the standards and guidelines administered by the DBA are concerned exclusively with quality of care and do not cover issues such as pricing or mandate which components should be included in each service.

According to the *Health Practitioner Regulation National Law Act 2009*, there are a range of registration categories under which a dental practitioner can practice in Australia (Australian Health Practitioner Regulation Agency 2010):

- Dentist and dental specialists (DBA recognizes 13 dental specialties)
- Dental hygienists
- Dental prosthetists
- Dental therapists
- Oral health therapists

AHPRA also has a code of conduct for health practitioners to deliver effective health services within an ethical framework (Australian Health Practitioner Regulation Agency 2010). The code contains standards for practitioners' behaviors to enable them to work in partnership with patients/clients, maintain good relationships with other practitioners, and adhere to relevant national and state laws and regulations (e.g., antidiscrimination, child protection, etc.). Broadly speaking, there are three levels of unacceptable performance defined in the *Health Practitioner Regulation National Law Act 2009*—unsatisfactory professional performance, unprofessional conduct, and professional misconduct.

In Chile, before 1981, newly graduated oral health professionals were required to register with the "Colegio de Cirujanos-Dentistas" (Order of Dental Surgeons) to be able to practice. This body was responsible for ethics, the determination of fees, and also the study of private contracts. Malpractice actions were also taken by the "Colegio." After 1981, when the new constitution reduced the legal status of the Colegios, all of the Professional Orders were dissolved, as they were considered a threat to the free market forces. Since then memberships have been on a voluntary basis and their code of ethics just cover members. They still publish a fee-for-service schedule as a reference, but this is not mandatory, as it was before. Malpractice is part of the ordinary justice system and there is no mandatory malpractice insurance. In 2014, accreditation for dental specialties training was

implemented. However, there is no legal recognition for the practice of specialties in Chile.

2.5.5 The Professions, Public and Political Environment

The Australian Dental Association (ADA) is a national body representing dentistry in Australia (Australian Dental Association 2015). The ADA actively participates in policy, advocacy, and research on issues concerning the dental profession in this country. Overseas-qualified dentists can choose to become ADA members and make use of the professional development programs run by the ADA. In addition, several organizations are actively involved in the collection and reporting of aggregated dentist data in Australia. This mainly includes demographic characteristics, geographic distribution, and practice activity patterns. Key stakeholders include: Australian Bureau of Statistics, Australian Institute of Health and Welfare (and collaborating units), and a few university based research centres (Duckett 2006; Balasubramanian and Teusner 2011; Australian Bureau of Statistics 2012). Data collected by these organizations assists in dental workforce policy and planning in Australia.

2.6 Final Remarks and Conclusions

The strengths and weaknesses of each system acquire much more meaning when seen in its political, economic, and cultural setting. The oral health sector and health in general in Australia is very different from the hierarchically structured system in Chile. However, in both countries, the government owns community health centers and provides direct health services to their citizens, develops policies, and implements programs. Also, in both countries, the private sector dominates the supply of oral health care, and is less susceptible to government control, other than licensing and accreditation. There has been an overall decrease in the relative number of people covered by public oral health care services and in public expenditure on health. With dental sections particularly vulnerable to cuts, beneficiaries of the public system will continue to rely on community health centers for their ambulatory health care needs. Thus, the SNSS is and will continue being the largest provider of health in Chile, and in Australia public programs will continue to be important.

In this chapter, we have provided an overview of some of the key licensing and regulatory practices. We have introduced a framework that could be applied to various country contexts. We have also examined the emerging phenomena of international migration of dentists, and how this affects licensing and regulatory practices. Of particular significance is the role played by multiple stakeholders, there are complex interests at stake here: those of employers; OHPs; professional organizations; the general public, regional, national, and provincial governments;

and global organizations. Licensing and regulation practices often have to muddle through this complex web to identify what is best in each country context.

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How to Select a Career in Oral Health

3

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Abstract

Oral health care offers a wide variety of roles for those considering a career in the oral health professions. Although the titles and definitions of these professions vary between countries, they are generally described as dental surgeons or dentists, specialist dentists, dental therapists/oral health therapists, dental hygienists, dental technicians, dental prosthetists, and dental assistants. Students considering a career in oral health should note the various different professions and understand that each one is defined by the education and training required. The educational pathway for each profession also varies considerably between countries. For example, in many countries, dental surgeons or dentists are required to complete a 5 or 6 year full-time university degree. In the USA and some European countries, students must undertake a two-part or graduate degree structure, completing a Bachelor degree (e.g., Bachelor in Biomedical Sciences) before progressing to a 4-year professional degree with a more specialized focus, which usually culminates in a professional doctorate. Oral health professionals may work in the private or public sector, and prospective students should take every opportunity to familiarize themselves with potential career paths through programs such as internships.

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3.1 Introduction

This chapter provides a description of the full range of oral health professions and their scope of practice from an historical and international perspective. It will also provide a broad description of the educational and entry to practice requirements for oral health professionals and the skills that are considered essential for oral health professionals to ensure appropriate patient care. It will explore the responsibilities involved and look at some of the occupational career opportunities available for oral health professionals.

If you are about to conclude, or have already completed secondary education, it is likely that you have asked yourself many times (and most likely by everyone around you) about what you want to do next. If you feel you would like to work with people and have good communication skills, have an interest in science and health and a capacity for detailed technical work, then oral health might be career for you. This chapter is aimed at somebody considering oral health as a profession or a student in the early stages of the field who may feel unsure about their career options. The last section of this chapter includes personal accounts by oral health professionals to highlight the diversity of career journeys and experiences in practicing oral health.

The focus of this chapter is on the members of the oral health care team who provide direct clinical care for patients. Of course, the office staff, receptionists, and practice managers are also part of the team; however, they will not be covered in this book. Firstly, because they are not generally required to register and their training is not specific to providing clinical care.

3.2 Oral Health Professions and Occupations

In some countries, the dentist and the dental assistant are the only professionals providing oral health care; in others there is an oral health professional team made up of several professions and occupations. These generally include:

- Dental surgeons or dentists, and specialist dentists
- Dental therapists/oral health therapists
- Dental hygienists
- Dental technicians and dental prosthetists
- Dental assistants

There is a wide variation from country to country around what these professionals are called and their scope of practice, as well as the regulations that describe what oral health practitioners can and cannot do. The practice of oral health care includes a variety of roles for those considering a career in oral health; these are mostly defined by the education and training that oral health professionals have undertaken. In some countries, there are educational pathways that allow people to add skills and move from one occupation to another.

If you have oral health as your broad area of interest, but are not sure which exact career is for you, a good starting point might be to attend college or university open days, so that you can see what is the profession is about. If you go to an open day you will usually have the chance to talk directly to students and professionals and ask specific questions about oral health professions and occupations, their training, roles, future, and expectations.

Another possibility, if this is available, is to undertake an internship or work experience in a dental office or community dental service during your final year of high school or even as a junior undergraduate. This would further refine your knowledge and first-hand experience with your potential or preferred career choices. In both situations, you have to reflect not only on what you would like to do, or on what you enjoy doing, but also think about the type of opportunities that will be open to you once you complete your first degree and career opportunities in the future. Not all oral health professions offer the same opportunities for progressing in a career. Knowing this early may be valuable in helping you decide whether this is the career path that you would like to pursue.

3.2.1 Dental Surgeons

Dental surgeons or dentists are the oldest oral health care profession. Dentists are trained in schools attached to universities, sometimes within other professional schools such as faculties of health sciences. As mentioned in Chap. 1, the first school of dentistry, the Baltimore College of Dental Surgery, was founded in 1840 and this model was followed around the world. The program of studies required to obtain the title of dental surgeon is variable depending on the country. Generally, there are two models, a one-part degree leading to a Bachelor degree or equivalent or a two-part degree structure leading to a master or professional doctorate.

In countries with a one-part degree structure, the duration of these studies is 5–6 years full time of theoretical and practical instruction developed at a university. In the two-part or graduate degree structure (USA and some European countries), students complete a Bachelor degree (e.g., Bachelor in Biomedical Sciences) before progressing to a 4-year professional degree with a more specialized focus, which usually culminates in a professional doctorate (i.e., Doctor in Dental Surgery; Doctor in Dental Medicine). In the last few years, this has become more and more common, with some Australian universities (The University of Melbourne and The University of Western Australia) offering this two-part degree pathway.

A third model was in practice for much of the twentieth century in some European countries such as Spain, Portugal, and Italy. In these countries, dentistry was a specialty of medicine. Thus, to obtain a degree in dentistry or stomatology, it was necessary to first obtain a degree in medicine and then to undertake the dental specialty. However, this model has changed with the criteria of harmonization of degrees imposed by the European Union.

In most countries, a dental license (working qualification as a dental surgeon) is automatically given to a graduate of oral health schools/faculties or universities.

However, in some countries (USA, Japan, Korea, Thailand, and Philippines), new graduates have to pass the authorized national (or local) board dental examination to get a dental license. He/she can only engage in dental practice after the registration procedure as a dentist.

Licenses to practice clinical dentistry are not valid worldwide; therefore, oral health professionals (e.g., dental surgeons) can only work in the country of registration or specific area. If a dental surgeon wants to practice in another country, she/he must follow another country's dental regulations and registration system (See Chap. 2).

Dental surgeons or dentists work as independent practitioners and provide assessment, diagnosis, treatment, and management of diseases and oral infections, as well as offering preventive services to patients of all ages, as a general dental practitioner.

In addition, it is not unusual that, after completing a Bachelor degree or the doctorate 4-year program, dental surgeons have the opportunity to further advance toward a specialty or a higher degree in a particular area. The specialist preparation may include a master's degree, a doctorate, or PhD, as well as specific training for specialist practice. It may also require registration as specialist. Specialists commonly develop higher level expertise in one area of care to treat specific conditions (e.g., cariology, periodontology, oral pathology), to use specific clinical techniques (e.g., orthodontics, endodontics, prosthodontics, surgery), or to treat specific age groups (e.g., pediatric or geriatric dentistry) or groups in the community (e.g., special needs dentistry). It is also possible to specialize and practice nonclinical dentistry (e.g., education specialist, public health, health management, etc.) although the field is relatively limited when compared to clinical practice. More detailed descriptions of oral health specialties and specialist training are covered in Chaps. 6 and 7.

3.2.2 Dental Hygienist

Another member of the oral health team is the Dental Hygienist (DH) who practices in many countries around the world. Both the USA (early 1900s) and Scandinavia (1924) saw the early development of Dental Hygienists whose role was to provide preventive services alongside a dentist, and in many countries, they originated in the armed services (Johnson 2009; Satur 2003). Today's DHs are primarily responsible for providing oral health assessment, diagnosis, treatment, management, and education for the prevention of oral disease, particularly periodontal disease, and to work with patients promote healthy oral behaviors. In addition to their work in preventive dental care, DHs also provide specific direct treatment to patients. DHs in most countries can take radiographs (dental X-rays), apply fluorides and pit and fissure sealants, undertake clinical services for periodontal (gum and tooth supporting structures) disease, and administer local anesthetic. An important role is dental health education and health promotion, either in the dental clinic or in the community, for example, with new mothers, school children, and residents within aged care facilities; it is this preventive philosophy that compliments the work of dentists.

In some countries, DHs work under the supervision of dentists, but in others, including Australia, the Netherlands, and some parts of Canada and the USA, DHs can work independently, but within a collaborative professional relationship with a dentist to enable the management of complex care (Dental Board of Australia 2014). In many countries, DHs also work in specialist Orthodontic, Periodontic, and Prosthodontic practices contributing to and complimenting the work of the specialist dentist. In parts of Scandinavia, Canada, and the USA, DHs may also practice expanded functions delegated by dentists, i.e., intraoral procedures normally done by them, such as placing and carving amalgams and resin restorations (Darling et al. 2015; Johnson 2009).

The specific role of dental hygienist varies and is dependent on the hygienist's education and the various dental regulations and guidelines of each country.

3.2.3 Dental Therapists

Dental therapists (DT) were introduced first in New Zealand in 1921 to provide basic preventive and restorative dental care for children in the School Dental Service. Today, after almost 100 years of experience, more than 50 countries currently utilize dental therapists (Nash et al. 2012). Some countries have produced other types of oral health professionals, apart from the those described here, but their life has generally been short, and these new titles have either been "temporarily suspended," as in Colombia and Chile in the 1970s (Daniels 1974; Nash et al. 2012), or just closed. Many countries have school-based dental therapist programs to meet children's primary oral health care needs.

Dental therapists provide oral health assessment and diagnosis and develop treatment or care plans. Like DHs, DTs have a preventive philosophy and predominantly provide direct clinical treatment, management, and preventive services for children, adolescents, and young adults. Although in some jurisdictions, they provide treatment for adult patients of all ages. Their scope of practice may include examination and oral health assesment, diagnosis, treatment planning and preventive care plus restorative treatment (fillings), tooth removal, additional oral care and oral health education, and promotion, and they also work in specialist pediatric and orthodontic practices. DTs generally work independently and also in a collaborative relationship with a dentist. They refer patients with treatment needs beyond their scope of practice to dentists and other health professionals where needed.

More recently, in jurisdictions including Australia and New Zealand, dental therapy and hygiene education has been combined to graduate oral health therapists who are qualified as both a dental therapist and dental hygienist. In Australia, dental therapists and oral health therapists practice autonomously and work within a collaborative professional relationship with a dentist (Dental Board of Australia 2014; ADOHTA 2017). This means that this professional is self-governing in decision making and practice, collaborating with and referring patients to dentists when their needs are beyond the scope of an OHT (Dental Board of Australia 2014). While some countries require their DHs to work in a practice with a dentist, in many

countries (Australia, New Zealand, The Netherlands, Canada, and parts of the USA), dental therapists, dental hygienists, and oral health therapists work in locations separate from dentists as primary health care providers (Nash et al. 2012; Teusner et al. 2016; Johnson 2009; Satur 2003).

Dental schools that train dental therapists and dental hygienists usually have a 2–4 year diploma and/or Bachelor level course. In Australia and New Zealand, oral health therapists complete a 3-year degree prior to being registered (licensed) to practice. After completing a Bachelor degree, DTs, DHs, and oral health therapists have the opportunity to further advance by undertaking a higher degree, most commonly in public health, health promotion, research, education, or health services management. Some also choose to undertake further study to become a dentist.

3.2.4 Dental Laboratory Technicians

The first dental laboratory was opened in Boston in 1887 by Dr W H Stowe. This led to the training of apprentices and later of dental laboratory technicians (National Association of Dental Laboratories 2017).

Dental laboratory technicians perform the mechanical and technical procedures involved in the fabrication of devices for the replacement of natural teeth, when for any cause (e.g., dental caries, periodontal disease, trauma, etc.) they have been lost. Dental technicians also work under the prescription of a dentist, to manufacture crowns or with an orthodontist to manufacture orthodontic appliances.

Qualifying as a Dental Technician is usually achieved by completing 2-year diploma level course, in association with an apprenticeship in a dental laboratory. In Japan, there is a 4-year bachelor program "Oral Health Engineering" for dental laboratory technicians. They can learn digital dentistry, the latest CAD/CAD systems, such as 3D scanners, 3D printers, milling machines, and a CAD computer, as well as traditional laboratory work (Please visit: http://www.tmd.ac.jp/english/ohe/index.html).

Some dental technicians, following additional training (usually an additional 1–2 years), are permitted to work as independent practitioners in the assessment, treatment, management, and provision of complete or partial removable dentures and flexible, removable mouthguards used for sporting activities. They are referred to as Dental Prosthetists in Australia (DBA 2014), Clinical Dental Technicians in the UK and Denturists in the USA, where in some states they have been licensed to provide dentures directly to the public (Ross et al. 2007). A dental prosthetist can work by referral from a dentist or be registered to provide care directly to patients as an independent practitioner.

3.2.5 Dental Assistant

Another important player in the oral health team is the dental assistant (DA). This professional fulfils a wide range of tasks, such as the sterilization of instruments,

preparation of the examination and treatment materials, entry and maintenance of clinical records, and preparation of study models. DAs provide chair-side assistance to the dentist or other dental practitioners in providing patient care, but are not allowed to treat patient directly. It is not unusual for some DAs to decide to move to DH and DT after completing the appropriate qualification (Mariño et al. 2014). Training for this role varies considerably from preceptorship type "on-the job" training through to 1–2 year programs in technical and further education settings.

In a number of countries, national planning for oral health care considers the identification and development of the dental workforce, which has seen the development of expanded roles or additional oral health professionals and sometimes a range of titles for similar roles. An example is the Expanded Duty/Function Dental Assistant/Auxiliary (EDDA or EFDA) in some states in the USA, the Prophylaxis Assistant in Europe, and the Orthodontic Assistant (Beazoglou et al. 2009). These oral health personnel undertake a wider range of tasks than dental assistants, but a smaller range than DHs or DTs. They perform tasks such as cleaning and polishing teeth, oral hygiene instructions, taking dental X-rays or orthodontic procedures under the direction of a dentist or orthodontist, and in some settings under the direction of a DH. However, not all countries recognize EFDAs, and the duties permitted by those that do vary considerably (Beazoglou et al. 2009). Practicing as an EDDA or EFDA usually requires the completion of an accredited training program after 2 years of experience as a dental assistant, and as indicated earlier, sometimes in addition to qualification as a dental hygienist. Roles and regulations in the USA, for example, differ from state to state and in Europe from country to country.

3.3 How Are Oral Health Professionals Trained?

The previous section included some descriptions of the different training requirements for oral health professions. In general, the completion of an oral health qualification requires theoretical and practical instruction and training, which can be divided into three areas: basic biomedical sciences, preclinical, and clinical dental practice. Basic biomedical sciences provide the background to preclinical and clinical subjects and support oral health care practice. Preclinical subject introduces specific knowledge about the structure of dental and oral tissues and the study of oral health and disease and conditions, dental materials, as well as simulation for the acquisition of relevant motor skills. After this initial period of training, subjects more specifically related to the treatment and prevention of oral conditions are undertaken. During this period, students' also undertake the actual clinical training for the provision of dental treatment, under the supervision of more experienced professionals.

Commonly, throughout the curriculum, there is also a strong emphasis on health behaviors, disease prevention, oral health promotion, and public health. Training not only focuses on the specifics of the oral health field, but also on statistics, the understanding of the scientific method and the fundamentals for evidence-based

practice, human behavior, and the links between oral health and general health. These subject areas receive more emphasis in the DT, DH, and OHT programs whereas programs preparing dentists naturally have more emphasis on surgical and higher technology skill sets.

Any student considering a career in oral health must be aware that these courses of education and training are often intense because of the need to develop knowledge and skills and the ability to apply knowledge and provide clinical treatment to people. Students should be prepared to develop the skills to communicate and work with people as these are caring health professions. Many people have life and health experiences that make it difficult for them to manage their oral health, and practitioners must be prepared to work with all types of people and in a range of community settings and clinics.

Candidates for careers in oral health must possess good coordination and dexterity in using small instruments in small working areas. In fact, one of the major hindrances in the provision of oral health care is the reduced working space and access to the oral cavity and the tooth. Therefore, manual dexterity, fine motor skills, and attention to detail are essential for the practice of oral health disciplines. Manual dexterity can be natural, but it can also be acquired and developed through practice. Nonetheless, anyone considering a career in oral health should not allow him/herself to be defeated in advance if their manual dexterity is not strong. Appropriate psychomotor functions as well as other technical skills can be gradually acquired simultaneously with other skills needed to provide oral health care. Over time, an oral health professional will come to perform the required clinical acts confidently and naturally. Furthermore, apart from having an interest in learning an oral health professional student will learn to think critically, appraise evidence, and learn to apply their scientific knowledge to make treatment decisions.

In addition to the basic knowledge acquired throughout his/her professional training, an oral health professional must develop the ethical, emotional, and even artistic qualities that will support him/her to work professionally in the clinical environment, with calmness, responsibility, altruism, and efficiency, in order to provide the best care for people and the community.

Patricia Benner (1984) described five levels that a nurse will go through as he/she develops clinical expertise. In the acquisition and development of a skill, a nurse passes through five levels of proficiency: novice, advanced beginner, competent, proficient, and expert. This can be extended to any health profession, including oral health. According to Benner, a professional advances in clinical expertise as his/her knowledge is perfected and expanded by experience. The same applies for oral health professionals. As an oral health professional progresses and advances in his/her career, they will become more experienced.

3.4 How Are Oral Health Professions Practiced?

There are several career paths that could be taken by oral health professionals following graduation to meet their career objectives. Some of these would require postgraduate qualifications; however, the majority of oral health professionals work as clinicians, providing instructions and education on self-care and prevention, as well as direct, curative, and restorative care to their patients.

Oral health professionals can work as private practitioners or as public oral health care practitioners. They can also work as researchers, academics (for the training and education of oral health professionals), in the armed force, in the dental industry, dental material and equipment manufacturers, etc. These career paths are the subject of separate chapters in this book, but to get the big picture what follows is a brief description of work in the private and public sectors.

3.4.1 Private Oral Health Practice

As described earlier, not all oral health professionals can work independently in the private sector; however, for dentists and dental technicians, this is generally the case. In some countries, dental prosthetists, hygienists and therapists, and oral health therapists can be practice owners, while in others they must work for dentists. Dental practitioners working in the private sector provide dental services through small businesses participating in a commercial market on a fee-for-service basis, deriving their income directly from patient fees or from patients with private health insurance. Most publicly owned health insurance has no specific funding for dental services rendered by private dental providers, so dental fees often are paid for directly by patients.

Private practitioners have their own staff, purchase their own equipment, pay rent, and function as managers of their own dental practice. Private practitioners may work for themselves or with a group practice. Within the private system, oral health care services are provided on demand, usually structured under self-funded arrangements. Each professional provides services within their defined scope of practice according to the jurisdiction's regulations and laws governing dental practice.

However, dentists practice dentistry is changing, and although most dentists still work in small to medium-sized practices (i.e., 1–5 dentists, including dental specialists, other oral health practitioners, and support staff), there is a growing global tendency to move away from solo practices, with a rising number of larger corporate practices and practices run and managed by private health insurance companies (See Chap. 10).

3.4.2 Public Oral Health Practice

Oral health care is also provided in oral health care facilities located at public hospitals and/or community health centers operated by health authorities, and through mobile or outreach programs with different levels of involvement from the government. However, public systems differ across jurisdictions, even within the same country, and the manner in which services are provided varies greatly between systems as well as for different populations within the systems.

Generally speaking in the public system, care is provided only to those who meet eligibility criteria for public care (e.g., socioeconomic background, income level, age, working status, etc.). Access to public oral health care is generally provided on a "first-come first-served" basis and is sometimes arranged according to needs such as pain or trauma. However, compared to the private sector, oral health needs in the public sector are greater and usually a larger proportion of the population needs publicly funded care than is eligible for this care. A smaller proportion of dentists and oral health practitioners work in the public sector. Public sector programs are funded under oral health programs developed by national or local health authorities with objectives to achieve defined outcomes among particular population groups—usually those with high needs who cannot afford to pay for private dental care. These programs are developed periodically based on educative, preventive, restorative care and emergency treatments and evaluated against population disease levels and health targets.

Community oral health professionals are usually part of teams working in close communication with others (e.g., medical practitioners, nurses, pharmacists) providing a multidisciplinary approach to patient care and education.

Within the public system, some oral health professions may take senior roles as coordinators in a special field or for the management of a team of oral health professionals. Furthermore, it is not uncommon in the public sector that less experienced professionals can learn from senior oral health professionals.

On the other hand, while freedom of choice of treatment which best suits an individual's needs and desires is a key principle of the private sector, there are sometimes challenges with this in the public sector. Because of the nature of the public health sector funding, oral health professionals working in the public system may have less choice than those working in private practice, for example, around the dental materials and procedures he/she will employ and the equipment to use for the achievement of clinical results. Oral health professionals working in the public system are governed by evidence-based policies aimed at achieving the best use of public funding; this may reduce the number of treatment options.

Often oral health professionals working in the public sector, after completion of their duties during the day, work in the private sector in their own surgeries or are employed by other oral health professionals in the evenings and weekends. Some practitioners also choose to work part time in more than one practice to have variety in their work, and work in both public and private sectors. In addition, there are several examples around the world of the private and public sectors interacting,

combining their unique attributes and strengths to increase the capacity for program development to achieve and maintain oral health.

Japan has had a public health insurance system with universal coverage and compulsory subscription since 1961. It covers almost all dental treatment as well as medical care. Dental services are available for most restorative and prosthetic treatment and surgical care, such as fillings, endodontic treatment, crown & bridges, dentures, and extraction. Patients directly pay 30% of the total fees, and other costs are covered by public insurance. There is no charge difference between private and public dental facilities. Moreover, private dentists are appointed by local government as school dentists and they contribute to oral health promotion activities for schoolchildren. In Japan, public oral health services are mainly conducted by private practitioners in the community. It is an unique dental system, quite different from other countries.

3.5 Final Remarks

As we advance into the twenty-first century, there are no signs of decline in the demand for oral health care services, quite the opposite. Several jurisdictions are predicting future shortages of oral health professionals and most evaluations recognize the need for more preventive approaches to oral health and a wider range of practitioners to meet all the needs of the population (World Health Organization 2017; Nash 2009; Institute of Medicine 2009; Department of Health 2014). Furthermore, the services of oral health professionals are needed at all stages of the life cycle: from pregnancy through childhood, adolescence, adulthood, and into older ages. With many countries around the world experiencing aging populations, the challenges for people living longer and keeping their teeth into older age will see demand for oral health care continue to grow.

A recent poll conducted in Australia regarding perception of the honesty of 30 professions indicated that health professionals in general continue to be among Australia's most highly regarded professions, in terms of ethics and honesty (Roy Morgan 2017). Dentists were in the sixth place behind medical doctors and nurses, before police, but after engineers. However, all oral health professionals, not only dentists, impact the health and quality of life of the community and serve society in many ways. Therefore, we can expect the same appreciation for honesty and ethics for all members of the oral health team.

My Personal Journey (Julie Satur)

I began my career as a dental therapist when this was a new profession in Australia and spent the first years working in the School Dental Service providing clinical treatment and oral health education in primary schools in suburban Melbourne, Australia. After some years of experience, I took a role as a senior dental therapist leading a team and managing service delivery across a region. My interest in health education also led to a role in the Health Education Unit in the state health department, designing programs for community groups and developing resources

for others to use. Because of this interest, I began postgraduate study in Health Education and Promotion leading to a Master's Degree in Health Science (Health Promotion). My Master's degree had included coursework in health policy, and this piqued my interest in how health policy influences oral health. I pursued this interest by undertaking a PhD, researching workforce regulation and how it affects access to dental care. This research led to my appointment to the Dental Board of Victoria, developing and applying regulation of practice for dentists, dental hygienists, therapists and oral health therapists, and dental prosthetists. In the early 1990s, I also started doing casual clinical teaching and lecturing work in the Dental Therapy course and in 1996 I was appointed to the University of Melbourne Dental School. This was an exciting role as it was the first Oral Health Therapy program in a university dental school in Australia and I was involved from the beginning, writing curriculum and teaching. I have remained at the University of Melbourne since that time developing curriculum, teaching, leading the Bachelor of Oral Health Program and undertaking workforce and health promotion research. My biggest interest throughout my career has been oral health inequalities and how we can make the system better so that more people, particularly disadvantaged people with high levels of disease, can achieve better oral health.

My work at the university has enabled me to take students into the community to provide oral health promotion and show many organizations the opportunities there are to utilize dental therapists, hygienists, and oral health therapists both to provide clinical care and to increase prevention as a core part of oral health services—both increasing supply and reducing disease. I have also been fortunate to be involved in oral health policy at a state and national level. My academic role has also taken me overseas to present my research at conferences and participate in curriculum development in the USA, Fiji, New Zealand, and Canada and to develop relationships with similar programs in countries such as Denmark and Sweden.

Throughout my career I have also been involved in the professional association for dental therapists and oral health therapists, filling roles such as secretary, president, and national councilor, developing codes of ethics, submissions, undertaking advocacy, political lobbying and media work on behalf of the association. I have also been the editor of the Australian and New Zealand Journal of Dental and Oral Health Therapy and helped run many conferences and other association events.

Dental therapy has been a great career for me, offering satisfaction and many opportunities to grow and develop. I always enjoyed working with people in a clinical health care role but it has provided much more than that—I have been able to develop skills in health promotion, policy making, media and advocacy, regulation, management, research and education. The volunteer work I have done has added to my skills and networks in so many rich ways, giving many opportunities and friends I would not otherwise have had, and best of all has contributed to improvements in the way things in the dental world work.

Personal Career Path: Yoko Kawaguchi

I have always had a sweet tooth. In childhood I liked cakes and candies and I frequently drank sweetened juice and ciders. I always chewed sweetened gums and I

only brushed my teeth once a day in the morning. As a result, I suffered from lots of dental caries.

In Japan, we have a school dental system provided by local government. A school dentist (private practitioner) comes to primary and high schools and conducts an oral health examination at least once a year on each child. So after the examinations at school, I was always advised to have treatment. I often visited a dental clinic where my dentist provided fillings and I was relieved from the sensitivity or pain. But I never received caries prevention advice at all from my dentist.

In those days, caries prevalence was very high in Japanese across all ages, but there was a shortage of dentists and hygienists. In the dental clinics, reservation systems were not popular and in the "first come, first served" system, patients had to wait for a long time to receive dental treatment. Dentists were busy managing caries treatment and had little time to give effective preventive advice to patients.

Therefore, I had no chance to change my oral health behaviors. One day a small amalgam filling fell out, I received treatment again, it fell out again, and it became a big cavity. Endodontic treatment was necessary, and finally I received crown restoration.

As I had visited the dental clinic so often and had become very familiar with the dentist's work, I decided to become a dentist myself. At university, in the curriculum of preventive dentistry, I learned a lot about preventive methods of oral diseases. I regretted my previous oral health behaviors. I also realized in my clinical training that the patient's treatment tooth was usually not a new cavity; it was most often a recurring caries or treatment for a missing tooth.

From these experiences, I became convinced that prevention is more important than treatment. Therefore, after graduation from dental school, I decided to become an academic in the staff of the Department of Preventive Dentistry.

For about 40 years, I have been engaged in educating dental students and dental hygiene students, I have also provided dental treatment at the university hospital, mainly for preventive purposes, and I have conducted research about prevention and the life course of oral health promotion. In my academic career I have been lucky to have the opportunity to study abroad; at University of Melbourne in Australia, at NIDR/NIH in USA and at Copenhagen University in Denmark. This has widened my viewpoint of preventive dentistry and I have learned that "Think globally, act locally" is necessary.

Prevention has dual dimensions; individual prevention and public health. For individual prevention, the private practitioners' role is very important as is that of dental hygienists or oral health therapists. Treatment time is the best opportunity to give the necessary advice to change patients' oral health behaviors. For public health, adequate oral health policy and effective community action is necessary.

Treatment depends on the dental surgeons' skills. However in prevention, the dentists' role is not central, it mainly depends on the patients' or communities' efforts to change behaviors or policies.

I hope lots of young students enter the field of oral health, enjoy dental work and contribute to oral health promotion worldwide.

The Importance of Being a Dentist (Nelson Herrera Dental Surgeon/Writer)
When completing our secondary education, we are typically full of vitality, with ideals and dreams about our future and the world in which we want to live. One of the expectations is to study a profession or trade that will allow us to develop careers and to be able to live in the real world. I studied in Chile, in the city of Valparaíso, at the beginning of the military dictatorship that devastated my country, leaving an imprint of horror and death.

Due to the political conditions in Chile at that time, once I graduated, I started working as a private practitioner, which, as we know, brings some advantages and disadvantages, particularly in a country vulnerable to cyclical global economic crises. On the pro side, being my own boss has allowed me to travel, one of my passions, both inside and outside the country; to get to know other cultures and, particularly, other human beings.

At the same time, the practice of the profession, year after year confined within a few square meters, with basically no company apart from the dental assistant, opened my mind to those who turned to me to heal their oral diseases and conditions, and it was that experience that taught me the motley condition of human existence. Each new patient is a friend and a world to discover and know. At the same time, and this is one of the key aspects of the profession, devoting time to them, listening to them, face to face, in times in which interconnectivity through social networks is so wide, has allowed me to realize that loneliness is real and more widespread than commonly believed. In other words, as a dentist I have also been a healer in many other ways.

As an oral health professional, I have treated musicians, filmmakers, writers, poets, drug-addicts, prostitutes, army and navy personnel and political prisoners. In this traffic of dissimilar characters, there have been events and stories that would suit all the various literary genres; from comedy to drama; from fantasy and science fiction to mythology; from horror and suspense to magic realism. Asked about the importance of being a dentist, within the wide range of possible answers, I will give the following example:

Treating a patient in the middle of a security deployment at your practice is by itself an unusual experience. It happened to me during the Pinochet dictatorship. A local Christian organization which provided relief to political prisoners asked me to provide treatment to one of them. They already had the authorization of the head of the detention centre at a regional city in which he was confined and where I practiced. This young detainee was brought to me by six heavily armed wardens, some of whom were posted at the entrance of the building, while others accompanied him to my practice. Needless to say, it was rather intimidating to have heavily armed officers behind. By coincidence, this patient lived in the same neighborhood as me in Valparaíso, and we established a good rapport. I extended the session as much as I could, for 2 hours we talked and laughed. We became good friends; he confessed to me years later that those 2 hours were an oasis of peace and freedom, a very curious evocation for a dental clinic.

This account accurately explains the importance of the practice as an oral health profession; reaching the patient with a dialogue based on caring within an equal

relationship, in which you listen and are listened to, in an informal yet professional way, further enhancing our work in health, beyond purely oral health.

It is through conversations with patients that an encounter between my own reality and that other world began to grow, slowly at first, yet it had been waiting for me since I was a child—a seed that began to germ in the long summer holidays spent with my family in a rural school in the countryside. Literature then emerged for me as a need for expression, to draw out ideas, visions, experiences through stories in the narrative or through poetry, and nourished at the same time by the connection with fears, joys, dreams, challenges, and fundamental questions that have surrounded us as human beings since immemorial times, in this case, for those who attend my clinic.

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4 Oral Health Professions: Education, Responsibilities, and General Overview of Careers in Oral Health

Lily T. Garcia, Carolyn Booker, Naomi Tickhill, and A. Damien Walmsley

Abstract

At different stages of their professional lives, oral health students and graduates need key information to be in the best position to achieve success as a professional and choose the career path that is right for them. This chapter describes examples from the UK and the USA, but the selection processes are similar to the majority of countries where the selection of oral healthcare professionals is a competitive process. Whether such processes lead to the selection of the ideal oral healthcare professionals will always be open to debate. The process of reviewing the selection criteria will continue and will be influenced by the educational paths within a particular country. As always, the aim should be to select students who will have the skills not only to navigate the academic curriculum but also to provide service to patients for the majority of their working lives. This information would help oral health professionals match their personalities and strengths with the best career path.

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4.1 Introduction

At various stages of their professional lives, oral health students and graduates may ask different questions about the best way forward for them. Personality characteristics and strengths can predict job satisfaction, and professionalism. Students and graduates need to know which questions to ask to acquire the most relevant information so that they are in a position to achieve success as an oral health professional. The information provided in this chapter will help oral health professionals match their personalities and strengths with the best career path for them.

This chapter also describes two examples from the UK and the USA, but the selection processes involved are similar to those in the majority of countries where selection of oral healthcare professionals is a highly competitive process.

4.2 Application Process and Students' Selection Criteria

Dentistry is widely seen as a valued profession by both prospective students and their families. There is status associated with oral health professional training, and dentistry is a career that is expected to provide good remuneration and stable employment. It may be argued that such good times in dentistry are nearing the end, but for the majority of people entering the profession these remain reasonable assumptions. There have been changes over recent years, for example in most industrialized countries there has been a shift in demographics from a male-dominated profession to one where females often make up over 50% of the university intake. In the majority of countries, the selection process is highly competitive and only students in the top percentile are admitted. Medicine and dentistry typically compete to be the most popular university course and as demand outstrips supply there is an increasing market for private dental schools. Students decide to study dentistry early in their life. As we see from the UK, students make these decisions aged around 15–16, as the selection of school subjects will dictate their eventual eligibility for a dental course.

The university selection process has also become more involved and complex as dental schools wish to select students on broader criteria than good academic grades, believing that grades alone may not provide an indication of the characteristics needed for the "ideal" dentist. The older generation of dentists, however, may complain that the present generation of dentists are not of the same quality as themselves. Such arguments are of course based on opinion, and it is difficult to provide an evidence base that assists admission tutors to select individuals best suited for the rigor and demands of dentistry. Nor is labor force planning an exact science and there are examples where government agencies prioritize candidates from rural areas in the hope that when they graduate they will return to their home base, only to find that the lure of large cities triumphs. Young graduates will make such decisions based on their perceived quality of life.

Just as there is pressure to obtain good grades and have a portfolio of activity to achieve a place in undergraduate dental training, there are similar pressures when

wishing to undertake postgraduate training in dentistry. Universities offer advanced training courses which may or may not be linked to a master's degree. Once again such places are competitive, and entry decisions are made on the quality of the undergraduate degree and formal references.

In summary, there is not one, straightforward process for the review and selection of an applicant into dental school. Best practices may exist but many address unique perspectives to meet institutional regulations and protocols. In most instances, for example in the USA, it is presumed that students in early education (7th and 8th grade level) should be taking science and math courses to order to best prepare them for the rigors of university/collegiate studies. Without the science, technology, engineering, and math courses (STEM) in early education, students may not be successful on a pathway for higher education such as in the health professions. Some admissions processes for selecting dental students include performance measures involving a battery of tests which include metrics such as academic performance and the ability to relate to other people. Some may include measures such as assessment of manual dexterity or a written essay to help determine an applicant's thinking process when presented with a question that involves problem-solving or decision-making.

The following sections provide case studies of how the application process for entry into oral health professional schools are reviewed and managed in different countries.

4.3 The United States Context

Dental education in the USA has evolved over the years. As *The Gies Report, Dental Education in the United States and Canada* (Gies 1926) describes, there have been significant developments. When Dr. William J Gies, a Columbia University biochemistry professor, published his report, this elevated dental education to a component of higher education. Since then, numerous publications have helped define the professional standing and respect that becoming a dentist implies. A landmark publication, *Dental Education at the Crossroads* (Field 1995), published through the Institute of Medicine, set a vision and educational direction that has helped frame the profession to meet and surpass the evolving healthcare environment.

There are a range of educational pathways for the oral health professions within the USA. The anticipated outcome from any rigorous education should be that the individual has the capacity to contribute both individually and as part of a team to delivering oral health care, as well as contributing to the overall well-being of the community. At the current time, there are educational programs for dental assistant, dental hygienist, dental laboratory technician, dental therapist, and a dentist, as well as the advanced dental education programs required to become a dental specialist in one of nine-recognized dental specialties.

Dental education programs are recognized through accreditation of the specific program. This process is conducted by the Commission on Dental Accreditation under the U.S. Department of Education (Commission on Dental Accreditation 2017). In the USA, on completion of a formal dental education program, it is State's

rights by law to determine dental licensure with the dental practice act detailing the licensure requirements and extent of practice allowed within a particular state.

The decision to pursue a dental education program can also be reflected in nontraditional publications that recognize the "best jobs" to pursue. In 2017, the *US News and World Report* published a ranking of jobs that provided the public with a vast array of career opportunities. The listing identifies careers that allows an individual to review what could be "a good match for. . .talents and skills," a broad snapshot of opportunities available with related requirements and rewards (US News and World Report 2017).

4.3.1 Dental Assisting

With over 300,000 dental assisting positions in the USA, according to the US Bureau of Labour Statistics (Bureau of Labour Statistics, 2017), a dental assistant is becoming a valuable team member in dental practice that can undertake a range of tasks in the provision of patient care. According to the US BLS, "some states require assistants to graduate from an accredited program and pass an exam. In other states, there are no formal educational requirements." Within the evolving healthcare environment, data from the American Dental Association (ADA) Health Policy Institute shows us that current dental assisting programs have over 15,000 applicants with 9290 accepted. There are 272 programs with a first year capacity of 11,323 positions available (American Dental Association 2016a).

Educational requirements indicate that approximately 82% of the applicants enter a program having a high school diploma, with the remaining having completed 1 year of college or other training. There are a variety of programs available with the vast majority in public institutions (87.2%) while others are in private nonprofit (2.1%) and private for-profit entities (9.9%), federal services (0.4%), and "other" (0.4%). The degrees awarded include diploma, certificate, and associate degree. The length of time for these programs varies from program to program; for example, a program that has the term defined under a quarter system of 9-weeks duration may require four (4) terms for completion of the educational program. The defined responsibilities and tasks within dental assisting practice are defined by state law. In some states with additional certification, a dental assistant may provide a broader array of task defined as extended dental assistants or EDA within dental practice.

4.3.2 Dental Therapy

In 2004, a new team member concept was developed and introduced through the Alaska Native Tribal Health Consortium (Pew Charitable Trusts 2016). The evolution of the dental therapist's responsibilities and scope of practice are defined and limited by legislation and licensure; dental therapy is currently approved in Minnesota, Maine, and Vermont. There is one educational program in existence in Minnesota that is currently seeking accreditation through standards which were recently approved by the Commission on Dental Accreditation. As of 2014, there

were 32 licensed dental therapists as graduates of the one educational program in the USA (Minnesota Department of Health 2014).

4.3.3 Dental Hygiene

There are over 200,000 dental hygiene jobs in the USA. There are 335 entry level programs, 50 degree completion programs, and 16 graduate level programs available (American Dental Association 2016a). The degrees awarded include certificate, associate degree, baccalaureate, and master's degree, the latter required for the role of program director within academic institutions. The majority of programs are in public institutions (83.0%), with 5.7% in private nonprofit, 10.7% private for profit, and 0.6% other (American Dental Association 2016b). The length of time for these programs varies, for example, a program can be on a semester timeline consisting of 15–16 weeks per semester and total of 4–5 semesters.

The most recent application cycle had over 33,000 applications with some 10,000 accepted. The need for dental hygienists is clear and according to the US Bureau of Labour Statistics, there is a projection of 20% growth from 2016 to 2026. The extent of dental hygiene practice is regulated by state law but at least one state allows for independent dental hygiene practices (Bureau of Labour Statistics 2018).

4.3.4 Dental Laboratory Technology

The dental laboratory technology field has evolved drastically over the past 10 years with the advent and development of digital dentistry technology. Health technologies are available that can be incorporated into dental practice, but one of the most significant implications affects the dental laboratory technology industry. The need for an individual with the education and training to support restorative and prosthodontic patient care has grown exponentially, especially considering the individual must have the background and expertise in digital technologies. Concurrently, there are fewer recognized programs in the USA and the number of programs remaining has stabilized at 19. There is a total first-year capacity of approximately 560 positions with first year enrolment at 320 (American Dental Association 2016a).

The educational requirements for enrolment reflect 84% of applicants with a high school diploma, 10.5% with less than 1 year of college and 5.3% with 1 year of college. The vast majority of academic programs are in public institutions (94.7%) with 5.3% in programs within federal services. The degrees awarded include a certificate/diploma or an associate degree. Most programs are on a semester system of approximately 15–16 weeks in duration, for a total of four semesters.

4.3.5 Dentistry

There are approximately 195,722 dentists in the USA, identified as "working in dentistry" (American Dental Association 2016a). When one considers the US

population to be approximately 325,000,000 (United States Census 2017), the distribution of dentists can be a challenge in some states. According to US News and World Report, in 2016, dentist is "#2 in The 100 Best Jobs" while orthodontist is ranked as the "#1 in The 100 Best Jobs" (US News and World Report 2017).

Any individual considering application for entry into a dental school must take the standardized examination—the Dental Admission Test (DAT), administered through the American Dental Association. In 2015, approximately 13,000 DATs were administered. This is not the sole requirement for admission into dental school but it is the key examination used as a metric for evaluation of dental school applicants. The predental requirements vary slightly among dental schools but generally require courses in English, Biology, Chemistry, and Physics, with a minimum of 3 years of college.

Each dental school determines their own requirements and based on whether the institution is public or private, may have certain mandates by which they are governed to meet those requirements.

The total number of applicants in 2016 was approximately 11,700, with 6077 enrolled. All applicants use the American Dental Education Association American Association of Dental Schools Application Service—ADEA AADSAS.

There are 66 dental schools in the USA with one additional institution recently having begun the process of becoming accredited. The US Dental Schools are categorized according to the Carnegie Classification of parent institutions (American Dental Education Association 2015). One recent trend in dental schools has been the concept of *whole file review*, which dental school admissions committees utilize when considering potential students. The concept is based on a holistic review of individual applicants, beyond the traditional measures of grade point average and DAT score, to include factors such as applicants' socioeconomic status, first-generation status, gender, race, and community of origin, among many factors considered (Urban Universities for HEALTH 2014). Since each dental school is mission aligned with their parent institution, various other factors such as state residency are incorporated into the admissions process. In this manner, there is no one process according to which all US dental schools manage their admissions.

Dental schools are accredited through the Commission on Dental Accreditation and must meet standards set forth by the Commission. The predoctoral education programs are four academic years in length and have a terminal degree that is either a DDS—Doctor of Dental Surgery or a DMD—Doctor of Dental Medicine or Doctor of Medicine in Dentistry, equivalent degrees according to the Commission on Dental Accreditation.

4.4 UK Context

Within the UK, there are 16 dental schools, and although they are competing for the best, high quality students, there is an unusual uniformity between dental schools that does not exist in other disciplines, particularly around admitting undergraduate students. This is possibly due to the critical nature of recruiting exactly the right

number of students each year as set by the Department of Health. Undergraduate applications are administered through a national organization called UCAS [Universities and Colleges Admissions System]. All applications must come to the university this way, unless there is a private arrangement for direct entry. Prospective students can apply for up to four dental schools and are able to elect a fifth choice in a different discipline. In general, training for dentists is 5 years (although for other dental professionals such as dental hygiene and therapists it is 3 years), and students qualify with a Bachelor of Dental Science, although one northern university uniquely graduates students with a Masters (MChD). All dental schools ask for high academic grades with Biology and Chemistry essential prerequisites. There are other requirements such as a clear criminal check and evidence of Hepatitis B and other relevant immunizations. Further requirements such as additional academic qualifications (e.g., a research project like the Extended Project) are specific to the school. Admissions tests are common, the most popular being the UKCAT, but for University of Leeds , the BioMedical Admissions Test (BMAT) is required. These tests are additional academic tests although they both measure different qualities. The BMAT assesses school leaver level science and requires an essay on a medical topic. Problem-solving questions are an integral component of this test. Competition, as one might expect, is fierce and as such all dental schools interview their students through a variety of methods, the two most common are traditional interview or the Multiple Mini Interview (MMI). It is quite common for students to apply several times before being accepted into the course.

4.4.1 The Application and Interview Process

Obtaining a place in an oral health profession course at any level is rigorous and competitive. The key characteristics sought include resilience, professionalism, integrity, patience and great communication skills. The Chief Dental Officer (England) suggested that resilience was one of the greatest attributes required by a qualifying dentist. In order for dental schools to assess applicants, prospective students will always be interviewed. Dental schools in the UK are generally moving away from traditional interviews, favoring a recruitment process using the Multiple Mini Interview (MMI). The MMI process, which originated at McMaster University, Canada, is a series of small interviews that test a range of attributes including some of those listed above. The key attribute that is likely to underpin all of the mini interviews is communication and this is tested in great detail in varying ways. Dental schools also aim to recruit students that reflect the society in which we live with diversity of culture, nationality, and ethnic groupings. Whether you are looking to establish a career as a dentist, a therapist, hygienist, a dental nurse, or a technician, universities will look for certain skills that will stand you in good stead for future practice in any setting: community, private, NHS practice, or hospital dentistry.

For those entering the profession at the undergraduate level, it is important to understand that from the outset you are being trained for a profession that will require a great deal of skill along with the personal characteristics that are essential for these

professions. No one wants to visit a dentist and be treated by a dental professional with no social skills, someone that does not put you at ease or who is arrogant.

In the UK, it can take up to 5 years to qualify for vocational training. Put to bed any thoughts of an easy ride through university! Dental School is equivalent to a full time job. You are being trained to behave in a professional and responsible manner. Giving 6 weeks' notice is standard for patients; planning is crucial if you are to succeed. Training for the oral health professions requires boundless patience and energy, a strong academic profile, a passion for the career, and the determination to succeed. It will involve continual learning for the rest of your working life but the rewards are plentiful. Gaining entry into dentistry is not for the faint hearted!

4.5 Personal Characteristics

Prospective oral health professionals will require a range of personal characteristics that will be assessed prior to entry to the profession and will be continually assessed throughout the course. Resilience, integrity, and courage are all key characteristics that will be developed by the course, but equally some evidence of these will be expected at the interview for dental school. In the National Health Service (NHS) Constitution, the six "C"s are expected to be used as part of value-based recruitment, both within the NHS and within those universities that are training students for NHS health professions. The six "C"s are communication, competence, courage, commitment, care, and compassion.

So let us look at these in more detail: Great *communication* skills—sounds obvious, but not everyone has this. Universities will look for evidence that you can easily communicate with people. It is essential that you work well with your dental team and with patients and not be the arrogant dentist that thinks they know best! The best oral health professionals are those that can communicate well with all kinds of people, from the cleaners to the patients, someone that values the contributions from different members. In order to ensure that the right treatment is given, you will need to work with your colleagues to discuss the way forward. The patient needs to be able to trust you and to witness collegiality amongst the team. The patient needs to fully comprehend what you need to do to them, why you think it is right, and the possible consequences of your actions. You will also find this skill helpful when you are working on shared assignments and discussing course materials.

Compassion and Empathy A good dental professional will look holistically at the patient's needs and not make uninformed judgments based on their appearance, background, culture, or living conditions. A great deal of empathy is required to understand your patient's needs and concerns when prescribing treatment for them. This skill is demonstrated when working with vulnerable people, such as those with dementia or other debilitating diseases, by treating them with humanity, for example, never speaking about them while in their presence. There are many other ways that you can demonstrate these skills.

Commitment and Resilience When the going gets tough, with exams, assignments, balancing clinical duties, treating patients, 4 hours back-to-back lectures—how will you cope? It can be tough at dental school but it is all good preparation for your working life. Each year you must accumulate a wide range of experiences and record them; it can be very stressful when there are not enough patients with the right problems (endodontics, orthodontics, periodontology) so it will be your resourcefulness throughout the degree that will ensure you make the most of every opportunity available. Making the most of outreach opportunities, for example, taking the time to assist your colleagues, working as a team to support one another, and taking that additional clinic to widen your experience. Personal resilience will be crucial to your success at dental school.

Courage All dentists need an element of courage, for example, to suggest a radical form of treatment or on the contrary to suggest a non-radical approach if it is in the best interests of the patients. If the patient disagrees, who is right? What if you witness poor practice amongst colleagues—do you have the necessary courage to raise concerns or in a particularly bad situation whistle blow? Working for the NHS will require you to draw on courage throughout your career. If you have prior experience of where you have shown considerable courage, you should demonstrate this in your application to university.

Care This should be an easier criteria to demonstrate if you have undertaken any work experience, such as helping older adults or working with vulnerable people. Do not underestimate the experience of looking after grandparents or younger siblings, it may not be glamorous, but if you have done it for a while it shows tenacity of character and a kindness towards others that will stand you in good stead for the dental profession. Consider what extracurricular activities you are involved in, think whether you can be kind towards elderly neighbors, visiting them, taking them for a coffee, being a listening ear for them. If you genuinely have these traits, it will be easy to provide substantial evidence for your application.

Competence To gain access to oral healthcare professions, you must be able to demonstrate that you have already been competent in something. If you can master one area, there is a strong possibility that with hard work and determination, you can master dentistry. Competence within the profession will be evidenced through your progression each year and to the end of your course. The Dental School reserves the right to not recommend you to the General Dental Council at the end of your degree if they feel you are not competent as an oral healthcare professional.

In addition to the values of the NHS discussed above, dental schools will look for a wide range of other attributes such as ethical reasoning, motivation, insight, life experience, social awareness, and reflective skills. Many of these will be evidenced through the characteristics described above, but it is good that you are aware of what they are and think through how you might demonstrate the current or potential ability to achieve them.

4.6 Summary

This chapter has described two examples from the UK and the USA, but these selection processes are similar to the majority of countries where selection of oral healthcare professionals is a competitive process. Whether such processes lead to the selection of the ideal oral healthcare professional will always be open to debate. The continual process of reviewing the selection criteria will continue and will be influenced by the educational paths within a particular country. As always the aim should be to select a student who will have the skills not only to navigate the academic curriculum but to provide a service to patients for the majority of their working life.

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Part II

Clinical Career Path in Oral Health

General Dental Practice as a Career

5

Jamie Robertson and Gustavo Moncada

Abstract

A general dental practitioner (GDP) is a dentist who has not specialized in any sub-specialty of dentistry. Generally, a GDP is qualified to diagnose and treat dental diseases and conditions in people of all ages. While GDP is a unique discipline, many oral health professionals in the early stages of their careers may be unaware of the breadth of work undertaken by GDPs. In most countries, GDPs will comprise the majority of the profession. In addition, in general practice, the concept of a job for life has long been replaced by the constant and ongoing need to acquire new skills and knowledge. The purpose of this chapter is to discuss career options and opportunities for GDPs. This chapter also describes how GDPs' needs, aspirations, and priorities change throughout their professional careers, in both private practice and public oral health care. A career as a GDP is rewarding, secure, and offers many opportunities for personal and professional development.

5.1 Introduction

With the proliferation of oral health specialties in the past 40 or so years, many more dental graduates have entered the specialist domain. In the USA, Solomon (2015) claims that specialists will make up about 22.5% of practitioners between 2015 and 2020. Yet the general dentist, in the USA and in most other countries, will still

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comprise over 75% of the profession and far from being seen as a lesser professional, the GDP will continue to be an important "home base" for people requiring only occasional specialist procedures. Also, patients in both medicine and dentistry generally dislike going through the revolving doors of different specialists without having someone to monitor, advise and encourage them at routine intervals. The GDP can be the conductor of the orchestra of oral care; specialists may be aware of each other's contributions but they do not have responsibility beyond their specific domain.

The purpose of this chapter is to discuss career options and opportunities for general dental practitioners (GDPs). This chapter will also describe how GDPs can enrich their professional life by obtaining additional experiences, education and knowledge as a way of helping their patients. General practitioners have different profiles in terms of workloads, work characteristics, etc. This chapter will also describe how GDPs' needs, desires, and priorities change through their lives and professional careers, in both private practice and public oral health care.

5.2 Where Are We Now?

Regardless of its location, ownership, or opulence, a general dental practice is usually the first point of contact the public has with the dental profession and it's where most dentists work. To put it in a general medical perspective, the general dental practice is the emergency department, diagnostic center, theatre suite, intensive care ward, rehabilitation center, and palliative care home for oral health, and, alas, the graveyard of many dentitions. Multitasking, high levels of skill and knowledge, and a compassion for the frailties of human nature are not only required but essential if a dentist is to survive in a long and happy career. Having a good sense of humor is also a priceless asset as it will lighten an intense day and foster good relationships with patients and staff. In long and notable careers, the authors of this chapter have learned the deep truth of the previous sentence.

Since the nineteenth century, some dentists have limited their practice to areas of dentistry which interested them. The establishment of university dental faculties and other institutions has fostered a huge increase in the knowledge and understanding of orofacial tissues, their form and function, the variables affecting them, and their disorders. The sum of this has led to increased dental specialization. Legislation has followed to confer specialist status on certain branches of dentistry (See Chap. 2). As described in Chap. 1, early specializations were Orthodontics and Oral, later Maxillofacial Surgery with the recent additions of Dental Public Health and Special Needs Dentistry. Nevertheless, throughout the evolution of dentistry, general practice has been the mainstay and gatekeeper in the delivery of services to the public. This has been true whether the service has been in the private or the public sector.

The general dental practitioner (GDP) is a professional who is trained to make multiple therapeutic decisions and recommendations that affect the lives of their patients, with professionalism and with a high degree of critical thinking whether in private practice or in community clinics, hospitals, or other public service

establishments, including the armed forces. As in all areas of knowledge, a GDP requires constant training to improve their knowledge and techniques. The half-life of knowledge seems to shorten every year, thanks to rapid scientific and technological discoveries. Today, there are multiple opportunities to update and extend knowledge and to undertake the training of new clinical procedures. Further, as described in Chap. 1, the paradigm of dental care has changed from removal and replacement of teeth to a more challenging one of diagnosis, prevention of disease, and retention of dentitions (Brennan et al. 2015).

The term "informed consent" has more currency now than ever before and the concept has become a legal requirement before dentists start to do anything and it's the general dentist who informs patients about options, their feasibility, costs and availability, and who hears the opinions of a patient after they have returned from any given specialist. It's a position of responsibility and trust.

5.3 How We Got to Where We Are

Modern dental practice evolved from the traditional occupational training of the master and apprentice relationship which predated the admission of dentistry as a suitable course for universities. An abbreviated history of the oral health profession is described elsewhere (See Chap. 1). The increased levels of training, knowledge, and status of the practitioner did not change the mode of practice for the great majority of graduates and for a long time dentistry remained a cottage industry of solo or small groups of general dental practitioners until late in the twentieth century (DePaola and Slavkin 2004). However, within the past 40 years, Acts of legislation in different countries or polities have permitted dental practices to be owned by non-dentists and this has led to the expansion of groups of practices being owned by corporate third parties, including health insurance organizations. Many solo practitioners resisted this at first, but the rate of corporate acquisitions and establishments has accelerated in the twenty-first century.

There has simultaneously been a trend for some dental practices to provide "aesthetic" or "cosmetic" treatment with little regard to oral health or behaviors and which derogates dentistry to no more than a dental beauty parlor. (However, there is nothing wrong with the term aesthetic; a sense of the aesthetic should pervade everything we do). This example of rampant consumerism has to be contrasted with general dentists practicing in rural and regional areas who often have to raise their skills across a broad range because they cannot refer their patients to specialists as readily as their city and suburban counterparts. The challenges for them may be greater but the satisfaction levels rise commensurately.

5.4 Where We Seem to Be Going

Concurrent with this explosion of advances in knowledge and technology and our understanding of ourselves have come great societal changes in attitudes, values, and means of communication. Among the most profound changes in health care has been

the change from paternalism to consumerism; in oral health, we have also seen the introduction of non-dentist ownership of practices, the advent of dental insurance and the inclusion of this to medical insurance policies. The latter two can exist separately or in a combined form. Graduates from dental schools are now entering a brave new world of practice where all three of these phenomena are inextricably linked.

A patient's right to informed consent before treatment is now mandatory and the old maxim of "doctor knows best" is gone. This sounds fine but the patient (or is that, client?) has less understanding of the outcomes and consequences of actions than the dentist, despite recourse to Dr Google. According to the older values and definitions of a profession by Sociologists like Eliot Freidson and Talcott Parsons, a dentist should put the patient's well-being before her or his own. However, a great challenge for a dentist is to maintain the primacy of patient well-being while trying to run a successful business (Berthelsen et al. 2008; Ozar 2012).

Relmann could have been speaking for all health care providers when, in 2007, he wrote an editorial for JAMA stating, "ironically, medical science and technology are flourishing, even as the moral foundations of the medical profession lose their influence on the behaviour of physicians" (Relmann 2007). He linked the decline in professional values to the commercialization of health care systems in which the primary concern for investors was the maximization of income. As Bartold (2013) put it more succinctly in the Australian Journal of Dentistry "profits over patients is the new catchcry."

The tensions between professional values and market forces can exist in any dental practice, but they are increased when non-dentist management demands more throughput and unit output from clinicians, either for profit in the private sector or funding in the public sector. As Harris and Holt (2013) wrote, "there is a pervasive unease that demands for greater care efficiencies traduce professional standards." Yet they also say that the situation is not binary and that there is an interplay between them. It's not a case of professional values, good; commercialism, bad. The most ethical of practices still have to cover costs and provide a living for the owner. A survey of UK practices in the late 1990s found that although patients felt that they received too little treatment in the public scheme (NHS) and received too much in private only practices, in general, patients believed that the skill and care of the dentists were similar in each. (Hancock et al. 1999).

Increasingly health insurance companies are entering the dental market either by conducting their own practices or by having "preferred provider" agreements. Dental insurance is not insurance as people would understand it when insuring a car or house against loss or destruction. It's simply an enticement for general health insurance policies and which gives rebates on treatment up to an annual modest cap. The insurance companies do, however, gain control over treatment fees which are held down. The business model is one of low cost per unit but high volume of units. According to Murphy (2016), since the rise of preferred provider organizations (PPOs) in the USA, dentists' incomes have declined relative to gross domestic product rises and treatment plans, and clinical decisions are now made more with insurance cover in mind than the symptoms or well-being of the patient.

In some Latin American countries, for example Chile since 1981, Instituciones de Salud Previsionales (ISAPRES) or private health insurance companies have been created to provide health financing, benefits and insurance services, including dental health. (Superintendencia de Salud 2017). In Chile, ISAPRES have grown to cover between 16% and 20% of the population in the last 10 years and as a result the coverage of dental care has increased. However, there has also been vertical integration between ISAPRES insurance funds and institutional service providers who in turn hire young dentists to work in the providers' clinics. The dentist pays all the overheads but cannot set fees and so tends to over-service or compromise standards. This has reduced the alternatives available to the clients of the system when choosing which of these providers to attend. Further, the ISAPRES may not be using part of the monthly contribution of their members (7% of their income with limits established by law) to cover the co-payment, since patients pay the full amount for their dental care. The origin of this problem may be due to weak regulations that affect free competition and unfortunately the performance of professionals. Finally, as a consequence of the above, the dentists participating in the system, like preferred providers elsewhere, have reduced their income compared to completely private dental practice.What compounds the problem and drives new graduates towards ISAPRES is that in Chile, a country of 17 million inhabitants, where three dental schools traditionally supplied dentists, the advent of private universities has increased the number of dental schools to 39, thus aggravating the imbalance between supply and demand for dental services and making it more difficult for new graduates to find good positions (Cartes 2013). The same situation of increasing numbers of private dental schools is true in several countries including India, Brazil (Saliba et al. 2009), and Mexico, but on a much larger scale in India (Samuel 2016). Regardless of whether one calls this problem one of oversupply, maldistribution, or a mixture of these, many new graduates are left underemployed and some of them seek work overseas, thus aggravating employment difficulties in new countries where they gain registration.

Even without the stresses of the cross-currents of consumerism and insurance, in recent years there has been a tendency for practices to grow in size, from single to several practitioners, regardless of dentist or corporate ownership. This has been due to increasing compliance and administration overheads, the cost of capital equipment and the need for patient throughput to pay for it, the ability to keep patients within the practice through internal referrals, and the desire by many younger dentists to work fewer hours than previous generations. Despite these pressures, there are still many solo or small general practices which have found a niche in the market for their services. A dentist who chooses to be a private practitioner is free to set the clinic hours and daily schedule to their own convenience and to create and lead their own dental team. However, in addition to the typical day's patient care, as the owner of their own business, a GDP must handle administrative duties (AIHW 2008).

The rise in compliance measures has been a factor in the increase in corporate ownership of practices as many young dentists have felt uncomfortable about the nonclinical requirements associated with running a practice. These started accelerating from the time of the HIV/AIDS scare in the 1980s and have become more burdensome as dental practices were brought more into the remit of agencies

determining standards for administration, infection control, occupation health and safety, quality of service, and latterly accreditation for every entity providing health care. These entities ranged from major tertiary teaching hospitals to solo dental and medical practices. Existing practice owners have had to adapt or go under but new graduates have seen the compliance levels rise and many have been deterred from owning practices. Corporate bodies have not been slow to say that they would take all this nonclinical administrative burden from the shoulders of dentists thus facilitating their growth.

Another way of removing nonclinical responsibilities is to work for a salary in the public sector but that can mean replacing one set of stressors for others. The scope of practice can be limited by budgets more than competence, salaries levels are lower than can be found in the private sector, and supervision and auditing can be either more intrusive or nonexistent. Nevertheless, the environment can be more technically and emotionally supportive, with greater opportunity to gain continuing professional education. The size of the public sector varies according to the prevailing political economy and that will determine how many work placements there are but new graduates can often find short-term positions which will help them transition from theory filled students to competent clinicians.

How successful the above scenario plays out depends on the presence of clinical mentors and the funding level of public clinics. Urban public clinics, particularly the dental hospitals associated with a dental school, offer the best chance of supervision and encouragement. However, if a new graduate is sent to a rural location, there may be no other clinician and the equipment may be in poor repair. In such circumstances, skills are more likely to wither than to develop. The first situation prevails in developed countries while the latter is all too common in many parts of Asia and Latin America. Nevertheless, in some of these countries, by offering to work away from large urban centers in a socialized care system for some years, a dentist can gain priority of access and funding to training in a dental specialty.

As mentioned earlier, dental practices are growing for business reasons, although there's no optimum size which covers all circumstances, but there are sound clinical and emotional reasons for working in groups. Although some stress reactions may be due to the personality of people who choose dentistry as a profession, the lone practitioner is more vulnerable to burnout and can't get emotional support from colleagues (Rada and Johnson-Leong 2004). A Danish study found that female dentists sought and received more emotional support than males independent of practice size (Berthelsen et al. 2008). A practical reason for working with other clinicians is that workloads can be handled better, and patient emergencies can be covered while a clinician is on leave. Again, procedures and specific cases can be discussed in a collegial manner at down-time although this tends to happen when any two practitioners get together. Dentists and all oral health professionals, especially those who work alone, need to make time to attend seminars and conferences to have these networking and case reporting moments with others. It's good for their patients' well-being and their own mental health.

5.5 It's the Relationship, of course

While older generations of dentists take the developments described above as an invasion and "disruptors" to their business model and proclaim the end of the world as they know it, new graduates take the current situation as normal. Even as modes of treatment for teeth have changed from replacement to repair to reinvention and prevention, one thing has remained constant and that is the relationship between the dentist and the patient. Patients' expectations and perceptions when visiting a dental practice, according to the literature, are less related to the technical competence of the dentist and more to do with the attitude and communication skill of the practitioner. Specifically, patients want a dentist who will listen to them; have a friendly, caring attitude; explain treatment options, procedures, and their likely prognoses, and most importantly inspires confidence (Fox 2010; Newsome and Wright 1999) because, apart from their dental needs, each patient brings their unique general health, psychosocial, and financial status, all of which have to be managed well (Sbaraini et al. 2012).

The above has come to be known as "patient centered care" as though it was a new phenomenon but it means essentially that the clinician focuses on the patient and explains the origin of their illnesses, possible courses of the disease, the preventive and curative methods to face it, dietary advice, recommendations of local care, hygiene, and all parameters involved in the disease, including biochemical and genetics explanations if they are available, showing at all times that he or she is really at the patient's service. It has always been the case that dentists who invested time in building a relationship, and thus a high level of trust, have gained more satisfaction from their careers and have accumulated more "goodwill" without even setting out to do so.

Successful dentists have always been those who worked hard at creating and sustaining good relationships with their patients and this will continue to be true regardless of how many specific procedures may be performed by robots in the future. The sum total of all the relationships is the emotional goodwill (EG) of the practice. This EG is linked to the emotional quotient or EQ of the dentist or dentists of the practice. A dilemma for young general dentists is whether they develop this EG for themselves or for a third party. There are perfectly good and valid reasons for a dentist to choose to be an employee of a third party but in so doing they donate some of this EG to the practice owner, just as they do the financial goodwill of their work.

Despite rises in the administration burden of owning a practice, and all these are compulsory for specialists too, there is still a great future and career for young people in general dental practice. Owning one's own practice offers the widest scope of practice for a dentist and for pursuing any clinical field of interest. Employees in corporate or public sector clinics may have restrictions on what and how much they do but they can still have fulfilling careers. The ability to offer and provide new forms of treatment also carries the responsibility to study and understand what any new procedure entails. There is more to learning than can be found on Facebook or

Youtube. Over the span of a working career, there will be many innovations of techniques and procedures and young dentists may find that the orthodoxies of their undergraduate course yield to later discoveries. For example, scanning and 3D printing will mean the end of stressful impression taking and basements or garages full of old study models waiting for legal oblivion.

To address the challenges which general dentists face, and to provide further education and training, and in part, to counter the lure of specialization, colleges and similar agencies in Australasia, Great Britain and elsewhere have in recent years established higher certification courses. In 1992, the Faculty of General Dental Practice was formed within the Royal College of Surgeons of England and later the Royal Australasian College of Dental Surgeons established Fellowship and then Membership courses for general dentists. These have satisfied both an intellectual need and a desire for credentials. These courses began before there was any mandated requirement for continuing professional education and they don't obviate such requirements. In fact, holders of these qualifications are expected to do more than the minimum number of hours required by governing authorities.

Being in general dental practice is a privileged position in the profession and it should never be seen as being second best to a specialist of any kind. Working in general practice is in itself a master class in the university of life. The patient pool is so varied that a dentist gets a deep insight into the life and times of the community in which he or she works. Learning to engage patients of all ages is an art which will build a practice more than any skill learned on a weekend course. In his work on leadership in health care Willcocks (2016) has noted that in a care environment like dentistry, there are unique stressors because the work involves often vulnerable people, not objects. The emotional quotient required by all dentists is high and that's not something readily acquired at dental school. Although centered on the personality of the dentist, it's something which, like experience, is acquired over time even if reading lots of Harvard Business Reviews will give insights into traits and tips.

Working in a private general practice enables the development of long lasting relationships with patients, indeed over a career one can meet and treat three or even four generations of one family of patients. There is professional and personal satisfaction in being given the privilege of treating patients over the course of many years. A general practice provides its own longitudinal study of the life history of teeth and their treatment. The general dentist is the only type of dentist who gets to see the full life history of the human dentition, from the teething problems of an infant to the flat and non-retentive edentulous arches of old age and everything in between—although probably not on the same person!

5.6 Re-creation

The old adage, "all work and no play makes Jack a dull boy" is relevant no matter what the work is. Regardless of administrative duties and required hours of continuing education, dentists need time away from practice. Family, friends, and interests are needed to recharge the batteries and keep balance in life. In skiing and in

life generally, balance is needed if you want to do it well. Any pastime or outdoor activity is good if it takes your mind off the first patient next Monday morning and it's even better if you can do it into your older years.

There is very little that is non-dental in the curriculum of a degree. We have to go back to earlier school years to find much broader subjects like music or art in its many forms, physical exercise and literature. Some or all of these we endured resolving never to return to them and yet maintaining an interest in any of them will help to provide a balance in the busy life of being a professional. Attending a concert, or better still playing a musical instrument, with friends helps overcome the stress of finding an elusive root canal or aligning an implant fixture. It's the same with messing about in boats or with paints although for physical exercise it's best to find one that doesn't lead to damaged joints by the age of 35. Of course new graduates want to deepen and broaden their clinical skills and knowledge as much as possible and they quickly find themselves entangled with loans and mortgages and new families. However, maintaining or finding pastimes is as much a necessity to a healthy mental and physical life as generating an income is to a financial life. The Latin phrase, *mens sana in corpore sano*, is as true today as it was 2000 years ago and in the pursuit of happiness, if that's what most people want, we should attend the temples of culture almost as much as the temples of finance. A burned out dentist at the age of 40 is not much use to him or herself or dependents.

Many graduating dental students may wish never to enter the halls of academe again. However, all should reflect on the fact that they have taken part in one of the most profound and effective collective experiments of humankind, namely education. In universities, groups of dentists create generations of new professionals in a regimen that allows the majority of the students to graduate as dentists. In this environment, an experienced general dentist may be able to become a mentor and guide, with appropriate educational methodologies, in the training of new professionals.

As well as educating students, universities undertake research to advance science. Science has its own methodology and instruments that can reveal hidden truths or can test hypotheses in reproducible ways, thus helping us make sense of the world around us. In dental science, researchers can use knowledge from many disciplines to develop more effective preventive or curative measures in the management of our patients' dental health problems.

GDPs can contribute to this ever widening pool of knowledge by returning to study a branch of dentistry which pricks their interest, after having explored the breadth of general practice. Delaying postgraduate education for a while brings a more rounded character and mind to the eventual enquiry. A more prolonged delay before recontacting dental schools allows a GDP to gain more experience in dealing with the mysteries of human behavior and the problems of trying to modify behaviors in order to improve oral health. None of this is to say that dental schools can accommodate any number of returning alumni, but it does mean that decisions about academic careers don't have to be made before or at graduation; a more seasoned mind can bring fresh perspectives to intellectual enquiry.

The stages of a career don't quite align with the seven ages of man, but there are distinct stages nonetheless. In the first few years, there is a need and a thirst to build skill and competence, adding to the theoretical knowledge gained at university; clinical judgment takes more than a semester or two. After about 10–15 years, we think that we have reached a stage of omniscience, albeit needing some tinkering around the edges, and this stage lasts another 20–25 years. Finally, we reach a stage of reflection and a questioning of some of our earlier certainties. In part, this is the human condition of aging and in part it's a growing appreciation or even veneration of the structure, form, and function of human tissues; a puzzlement at human behaviors; and wonderment at what we have done or failed to do to both. None of these changes can be isolated from ourselves as social beings. The first stage correlates to the young adult leaving the comforts and limits of home and experimenting with cooking, sleeping arrangements, and accountants. The second stage correlates to huge overheads and small families in which 4 year olds think that mummy and daddy are omniscient—until disillusionment quickly follows. By the third stage, the former 4 year olds have themselves left home, and our appreciation of the miracle of human oral tissues has been reinforced by the minute perfection of grandchildren.

Although the train of events described above happens regardless of occupation or career path, the general dentist has the capacity to keep reinventing him- or herself. This wards off burnout and provides intellectual challenge to the brain. Sometimes a dentist, more commonly a woman, who has taken time out to start a family can reenter the workforce in a different capacity. This can be by accident or design. It may be a move from the private to the public sector or the other way, or it may be to pursue an interest in, say, special needs or geriatric dentistry. Regardless of family rearing, male and female general dentists can develop a special interest in an area of dentistry and follow that through further education without the need to become a specialist. Restricting one's practice on either a full or a part-time basis is possible. As mentioned earlier, through general practice, a dentist can maintain contact across ages of patients and areas of dentistry so that a special interest can be pursued for the intellectual challenge while the balance of time allows longitudinal contact with patients and, importantly, a continuous reminder of the fate of previous treatment.

Another way to bring new perspectives and refreshed eyes to the routine of work is to volunteer our skills either based within our community or overseas. Honing clinical skills and acquiring greater understanding about patient motivation and management in general practice help a dentist to make other valuable contributions to society by volunteering services to humanitarian projects. In this respect, a general dentist is more useful than a specialist because the former keeps up to date with a broad spectrum of preventive and restorative techniques and materials and is more used to dealing with practical compromises and the foibles of strange equipment. The pro-bono work can be done in the dentist's own practice in association with a charity or on an ad-hoc basis or it can take place in a developing country. However, working in an alien environment is not the same as continuing High Street dentistry in exotic places; a degree of humility and adaptability is

required to achieve anything of sustainable value. Moreover, before heading off into the unknown full of enthusiasm but little else, a dentist would be wise to learn from the experience of others and read the WHO/FDI publication, *Basic Package of Oral Care* (World Health Organisation 2002). Apart from the obvious benefit of preventive or reparative care for people who otherwise could never receive it, there is enormous benefit to the volunteer. This is through the enrichment of life experience, the challenge of working in often difficult circumstances, discovering more about another society, how we handle stress, and the chance to reflect on how we provide services at home and how we might do it better. Commitment to others recharges our own batteries.

For those who wish to pursue the idea of volunteering, the following references may be useful.

http://www.who.int/oral_health/action/groups/en/index1.html
http://www.who.int/oral_health/action/information/surveillance/en/
http://www.who.int/oral_health/publications/en/

When Alvin Toffler coined the phrase "future shock" in 1970 in his book of that name, it described a sense of anxiety about the inability to cope with too much change in too short a period. If anything the rate of change has accelerated but new graduates, in the eye of the storm, can cope. In September 2016, the Federation Dentaire Internationale (FDI) adopted a new definition of oral health to reflect its multifaceted nature and capacity to change (Glick et al. 2016).

Oral health:

- Is multi-faceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow, and convey a range of emotions through facial expressions with confidence and without pain, discomfort, and disease of the craniofacial complex.
- Is a fundamental component of health and physical and mental wellbeing. It exists along a continuum influenced by the values and attitudes of individuals and communities.
- Reflects the physiological, social, and psychological attributes that are essential to the quality of life.
- Is influenced by the individual's changing experiences, perceptions, expectations, and ability to adapt to circumstances.

The complexity of the FDI's four-point definition reflects the diversity and range of aspects of care by, and challenges to, the dental profession. It is a rebuke to the notion of straight white smiles—cha ching! General dental practice will continue to offer new graduates challenge and satisfaction for many years.

It's said that young people now will experience several career changes during their working lives but for medicine and dentistry the changes will be fewer. It doesn't mean that middle-aged dentists will become vignerons, although that could be true for some, but that many of tomorrow's jobs haven't been invented yet. The rate of change is accelerating and that is true within dentistry as well as around it. The intellect and skill set of young general dentists will allow them to transfer relatively easily to other occupations, assuming they have paid off huge education loans, but there will be many new opportunities in health care for professionals to straddle two or more careers.

5.7 Conclusion

In terms of supply and demand there will always be people or organizations with the power to generate cheaper, faster, and more efficient services. However, points of difference will be founded on the service's quality, based on applying the best evidence, good clinical skills, and growing expertise, all combined with a prudent attitude and an ethically sound application of knowledge, respecting the patient's value and preferences.

The authors, GM and JR, have not met but have found that their ideas and opinions are closely aligned. Both believe that being a GDP is a richly satisfying but often underappreciated career. For GM and JR, the practice of general dentistry has allowed them to work in different countries while developing family care orientated practices, delivering care and advice to three successive generations. They feel privileged to have met such a wide range of amazing people in both public and private sectors. They have also been able to indulge passions for history and population health through further study and perhaps these interests have kept away boredom and burn-out.

We are in a period of transition and all areas of health will face successive changes in the future, because all sciences are progressing more and more at speeds to cause vertigo, so that the traditional practice of dentistry will evolve to new forms of diagnosis, prevention, and therapy. This premise is based on the fact that humanity is facing an unprecedented major qualitative leap in scientific and technological progress leading to profound changes in the management of diseases which in turn will affect the way of practicing the profession. Combining our current knowledge with new discoveries at the molecular and genetic levels, and from big data generated analyses, we will find further fields for research and its translation to practice. Doors are being opened for new methodologies in the treatment of diseases and the promotion of healthy lifestyles for people. From an intellectual and professional point of view, it will be a great privilege to live in an age of rigorous scientific advances.

Warm wishes for long and intellectually challenging careers.

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Dental Specialties: How to Choose Yours

6

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Abstract

Although, as described in Chap. 5, most oral health professionals practice as general dental practitioners, some will specialize in one area of care to treat specific conditions (e.g., periodontology, cariology, etc.), to use certain clinical techniques (e.g., orthodontics**,** endodontics, prosthodontics), to treat specific age groups (e.g., pediatric dentistry), or to work with particular groups in the community (e.g., special needs dentistry). This chapter explores the various clinical dental specialties and discusses the knowledge and skills needed to practice within these specialized areas of dentistry. The aim was to describe what somebody considering oral health as a profession, or what a recent graduate should expect from this career. The chapter presents a sampling frame of each of the specialties to guide the reader and help them to develop short-, medium-, and long-term career plans. The chapter also briefly describes the scope of practice for each specialty. The chapter finishes with insights from the authors' own journeys of becoming dental specialists and directors of undergraduate and postgraduate oral health disciplines.

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6.1 Introduction

This chapter explores the opportunities offered by the various dental specialties to the practice of dentistry, from nonclinical to clinical areas. We begin by introducing the notion of the dental profession from craft to a specialized field, before describing the most common specialties recognized in the world, and their importance to the dental profession. We noticed that dental specialties change according to different countries, and what is a specialty in one country may be considered only an area of interest or knowledge in another country. In addition, different countries may have different amounts of instruction times and standards of training which impacts on the recognition of specialists across the world.

As mentioned in the first chapter, the practice of dentistry has existed since the dawn of time. According to some reports (Namibian Dental Association 2016), the first known dentist was an Egyptian named Hesy-Re from 2600 BC. His tomb had the inscription "*the greatest of those who deal with teeth and of physicians.*" This inscription shows perhaps an already ancient attempt to distinguish, or rather separate, the actions of those working as physicians and as dentists.

Indeed, at the beginning dentistry was treated as a craft and later given the status of a profession. In some countries, however, the practice of dentistry may still be a craft—an unregulated occupation—more than anything (Burt and Eklund 2005). As a whole, "*the dental profession can be defined as the collective of oral health care experts who have jointly and publicly committed to altruistically provide their expertise in the service of all patients with important oral health needs and are in turn trusted by the public to do so*." (Welie 2004a, b, c). Although within the above definition one may debate whether or not dentistry is a profession, a business, or a combination of the two (Welie 2004a, b, c), dentistry for most industrialized countries is perceived as a profession that follows health care regulations and ethical and professional guidelines, under some business influence. As a health care profession, there will be times that a higher level of training might be necessary to better understand and alleviate complex treatment needs that a patient may have. Although specialized knowledge is needed for the sake of public safety and well-being, a recent report has argued that "*only minimal information is available on graduates' immediate career plans and factors that may influence their decisions regarding these plans*" (Nassar et al. 2016).

Therefore, the reason for this book and specifically this chapter is to better inform current and future oral health professionals about the pathways that can be chosen after graduation, beyond the practice of general dentistry. You may question "how to choose and specialize in an area of dentistry?" For example, think about how to approach a child with extreme behavior challenges or an endodontic case of a second molar with four curved canals? The choice to build a career within one of the specialties in dentistry can be stimulating and rewarding for some. If so, what has a specialty to offer you and the well-being of your patient? With rapid advances in dentistry, evolution of specialization, and marketing trends, choosing the right dental specialty for a patient's specific needs has become increasingly difficult for many people.

The practice of dentistry, at any level, has undergone several changes in the last years. Although the trend in developed countries has favored team practices over solo practices, the most notable change has been the increase in specialization. A few years ago, it was not uncommon for the general dental practitioner (GDP) to take care of all patients and their treatment needs. These days, the practice of dentistry has been mostly compartmentalized and highly specialized, with notable technical advances and skill development. This chapter explores the various dental specialties offered and discusses the necessary knowledge and skills to practice within the specialized area of dentistry. We start with a brief description of the available dental specialties across the world, with particular emphasis on North America, then ponder about the necessary qualities a dentist, either a generalist or a specialist, should have. We also discuss the necessary training to become a specialist from a student or a junior dentist's perspective. We then finalize this chapter by providing insights from our own journeys of becoming dental specialists and directors of undergraduate and postgraduate oral health disciplines.

6.2 Dental Specialties

Although general practice might fulfill most of the needs of the public, specialties are necessary where specific advanced knowledge and skills are needed to maintain or reestablish oral health. Patients might need a procedure that requires unique skills, and a specialist is recommended for the case. Furthermore, the evolution and development of dentistry have created the need for trained dentists who will provide complex and difficult dental procedures (Eliav 2010).

Specialists then emerged to fulfill the requirements of a specific area of dental practice as they get fully trained and hold a more in-depth and specialized knowledge. In general terms, a specialty is a recognized area of dentistry once it meets specified requirements, defined by a national professional association. Specialties ought to be recognized by such associations to ultimately protect the public, nurture the art and science of dentistry, and improve the quality of oral health care (American Dental Association 2016a). Within this general framework, each country must organize itself to cover the full range of its oral health needs, from the most basic to those needs that require additional professional training. In the same way, different countries offer a variety of pathways for postgraduate training in oral health, such as continued education courses or as full specialty programs. Specialties in particular may have a board certification process and an educational system, which normally involves long periods of full-time training and education. A specialist may also belong to a specialized association.

One of the most common routes for specialization is the attainment of a Master's degree combined with a diploma or a clinical or nonclinical specialty degree in one of the specialties recognized by the respective dental boards. This is the standard at which specialist education and training is provided in Canada, Australia, and other countries.

But because a specialization in dentistry is defined by local dental regulatory authorities, what may be considered a specialization in one country may not be

Table 6.1 Dental specializaties in dentistry in selected countries

General dentistry							
Clinical specialty	Australia	Brazil	Canada	HK	India	UK	USA
Endodontics	✓	✓	✓	✓	✓[a]	✓	✓
Oral and maxillofacial surgery	✓	✓	✓	✓	✓	✓	✓
Oral medicine and/or pathology[b] (specifically in Canada)/oral and maxillofacial pathology (specifically in the USA)	✓	✓	✓		✓	✓	✓
Oral and maxillofacial radiology	✓	✓	✓		✓[c]	✓	✓
Orthodontics and dentofacial orthopedics	✓	✓	✓	✓	✓	✓	✓
Pediatric dentistry	✓	✓	✓	✓	✓	✓	✓
Special needs dentistry	✓				✓	✓	
Periodontics	✓	✓	✓	✓	✓	✓	✓
Restorative dentistry		✓				✓	
Prosthodontics	✓	✓	✓	✓	✓	✓	✓
Gerodontology (geriatric dentistry)	✓	✓					
Nonclinical specialty							
Dental public health	✓	✓	✓	✓	✓	✓	✓
Forensic dentistry	✓						

[a]In India, there is a conservative dentistry specialty which combines restorative dentistry and endodontics
[b]Two separate specialties in Australia and Canada
[c]In India, dental radiology is part of oral medicine specialty

recognized as such in another country as dental authorities differ across the globe. Table 6.1 shows the specialties of dentistry in some selected countries while other countries may differ in numbers and types of dental specialties. For example, countries like India, USA, and Canada currently recognizes nine specialties (Canadian Dental Association 2016), while Australia and the UK recognize 13 specialties including forensic dentistry (Dental Board of Australia 2017). Brazil, on the other hand, identifies 22 different specialties in dentistry, ranging from dental geriatrics to stomatology (Conselho Federal de Odontologia 2015). Although specialties like prosthodontics and dental public health are common across different countries, others such as acupuncture, homeopath, and sports dentistry are not (Conselho Federal de Odontologia 2015).

In keeping with the sociodemographic transition around the world, changes are also occurring in dentistry and its specialties, including geriatric dentistry for the ever growing geriatric population (Brondani et al. 2012). Following the example of Brazil (Hebling et al. 2007), which was the first country to recognize the specialty of geriatric dentistry in 2001, that specialty is now being introduced worldwide. The Australian states of Victoria and South Australia have similar specialty designations. Nonetheless, in New Zealand and Sweden, the specialty of geriatric dentistry falls under special needs dentistry, an umbrella term that also includes hospital dentistry

and dentistry to those with impairment and disabilities. Similarly, the Special Care Dentistry Association (SCDA) in the USA has a diploma program in geriatric and special needs dentistry, but has to yet be recognized as a specialty by the American Dental Association (Ettinger 2010).

The discrepancy of specialty recognition across different countries may be a result of different country's policies or a response to a business marketing approach. In the USA, for example, one of the requirements (among many) to being recognized as a specialty is to have well-defined knowledge and skills that are separated from any of the already recognized dental specialties or by the combination of them (American Dental Association 2013). For example, operative dentistry is considered a specialty in some countries but in the USA it is considered an "interest area in general dentistry," more of a special area of knowledge for a general dentist; it is not a specialty. A similar situation happens with dental implants as some consider it a specialty while others do not. Implantology requires both surgical and restorative phases, and by bringing together surgery, prosthodontics, occlusion, and aesthetics some believe that it might be better positioned under the practice of a well-trained general dental practitioner (The Wealthy Dentist 2017) or a well-rounded specialist that knows about those fields. In the European Union (EU), the recognition of dental specialties is also a concern and varies widely across Europe (Gallagher and Eaton 2015). Although dentists trained in the EU and holding an EU nationality might be free to work in any member state (Glinos 2015), the official recognition of the specialist title from one country member to another is not a straightforward process because different EU member-states recognize different dental specialties. While some EU countries officially do not recognize any dental specialty, others recognize up to 13 different specialties (Gallagher and Eaton 2015; Sanz et al. 2008).

To summarize, not all countries across the globe recognize the various areas in dentistry as satisfying the requirements of a specialty. As a result, across-country mobility of dental professionals with specialty recognition might be difficult or even unfeasible from one country to another. Within this discussion, some important points have to be kept in mind:

- The interchangeable (mis)use of specialties versus abilities: the public and the profession may benefit substantially when non-specialty groups develop and advance areas of interest through education, practice, and research such as the case of operative dentistry and dental implants as discussed above. But these same individuals, despite their abilities, may not necessary hold a specialty status. One may have the ability to provide specialized care in a certain manner, but may not be a board recognized specialist per se. For example, the case of operative dentistry as an "interest area in general dentistry" in the USA and as a specialty area in countries such as in Brazil (American Dental Association 2016b).
- The different specialty programs' instruction time, workload, and clinical experience vary across different countries. In Australia, Canada, and the USA, an individual wanting to become a specialist has to successfully complete an accredited full-time advanced educational program in the area of the specialty (usually called Postgraduate Specialty Certificate Program). This individual may

also hold such specialty designation from a dental regulatory authority upon completion of the program by successfully passing a board examination as an additional requirement. In terms of specialty programs, some are combined with a Masters or Doctoral designation offered by a university, while others are clinical programs only.

- In Australia, Canada, or the USA, specialty students are enrolled in a full-time program for 2 or 3 years and have almost no time to work in private practice during their specialty programs. However, in some countries such as Brazil, some of these programs may be offered by professional associations and can be part-time compared to the American and Canadian models. In this sense, student-dentists can continue working in private practice while completing their specialty programs, but at the expense of instruction time. As dental students may graduate with large student debts, it may become attractive to do a specialty program that allows them to work to pay their student debts sooner at the expense of the instruction time. In fact, these specialty programs might run 3 or 4 days a week, by-weekly, or once a month over a weekend via a packed series of clinical practice sessions and lecture-based instructions (e.g., http://www.aboal.org.br/cursos-palestras). Such programs may run over 1, 2 or 3 years. Although students will be working in private practice or public dental clinics while doing those programs, a significant discrepancy in terms of instruction time is inevitable—the amount of didactic and practical hours a graduate may hold within the same specialty field across different countries will vary. As such, equivalence of programs and competencies becomes an issue when a specialist moves from one country to another; "recognition" of the specialty so that the specialist dentist can take the board examination may not be readily achieved and knowledge assessment through examinations and gap training may be needed.
- In Canada, an internationally trained dental specialist or a graduate of non-accredited dental specialty program who wishes to work may take the Dental Speciality Assessment and Training Program (DSATP) offered by some dental faculties. The DSATP is as a gap-training program with an initial 3-month assessment; this assessment will dictate the total duration of the program, from three to 12 months so that the clinical knowledge, skills, and judgment are in par with the respective specialties of that country. In order to apply for admission into a DSATP, applicants must complete the Dental Specialty Core Knowledge Examination to gauge their knowledge of the respective specialty (The Royal College of Dentists of Canada 2017).

6.3 Dental Students and the Specialties of Dentistry

Specialists are important to any profession. In dentistry, research has shown that graduating students do not necessarily plan to specialize right after graduation (Dhima et al. 2012). Although the majority of dental students in that study planned to enter private practice without specialization, some showed interest in pursuing postdoctoral nonspecialized general dentistry programs such as General Practice

Residency (GPR) or Advanced Education in General Dentistry (AEGD). When students do decide to pursue a specialty graduate program, the factor that most contributed to their decision seems to be "*the enjoyment of providing care in that [specific] field*" (Dhima et al. 2012).

Others have investigated whether the accrued debt from dental education could be a factor influencing the choice of specialization after graduation. Walton et al. (2006) found that educational debt influenced the students' decision, and the majority planned to start practicing general dentistry as a way to pay for their educational debt sooner. According to data from the American Dental Education Association, the average educational debt (combined undergraduate and dental school debt) of a dental student in the USA was $221,713.00 (using American dollar value as of March 2017) (American Dental Education Association 2018). Thus, for some students in North America, the extra $90,000.00–$210,000.00 value of a specialty program might not be very attractive, at least during the first few years of practice.

However, sometimes patients will need a procedure that requires unique skills and a specialist is recommended for these cases. Furthermore, the evolution and development in dental technology, from equipment to dental materials, has created the need for trained dentists who will provide complex dental procedures (Eliav 2010). Our next section will provide examples of dental treatments carried by dental specialists.

6.4 What Kind of Service Does a Specialist Provide? Who Is Being Served?

Choosing the right specialty is important. Everyone deserves the most advanced treatment dentistry can offer, and making engaged decisions is an integral part of this process. Throughout their undergraduate programs, dental students are exposed to most of the existing specialties available in their respective countries and have their first glimpse of what a specialty is all about. After that period, it is possible that they have a clear idea of their career path in oral health, either as a GDP or as a dental specialist. However, students need to understand that postgraduate studies are different from undergraduate studies. An undergraduate dental student is exposed to a wide range of specialties, while during a specialty training program they will focus on a specific area of knowledge and practice. In addition, postgraduate students are required to be more self-started, self-driven, and self-motivated with individual responsibility on their learning. It may also be more difficult than the primary oral health degree. Postgraduate studies are not the natural extension of undergraduate; this is particularly the case for higher degrees (e.g., PhD), where the workload is heavier. Students will be looking at a particular area at a higher level of competency and a more difficult and detailed level than previous degrees. Motivation and passion are key and will help with the barriers and hurdles to obtaining the qualification, along with the financial and personal sacrifices required to advance in the career path.

If students are still undecided, they should reflect on their own experiences and about what they enjoy doing as an oral health professional. Students should also consider their motivations, and why they want to continue studying. After that, they may explore each specialty in detail. It is important to consider the whole career and how students see themselves in the future. Discuss plans and ideas with an existing specialist in the area that you want to specialize. Talk to them, ask for their advice, and whether the specialty took them to where they wanted to be in their career paths. Reflect further about a graduate specialty study. Any further study requires an investment as we discussed above, and students will also be investing time and resources into more advanced studies.

It is impossible to predict the future economic opportunities that a specialty may offer, but consider that in the United States, the median annual wage for dentists was $158,310 in May 2015 (GollegeGrad 2015)—the median wage is the wage at which half the workers in an occupation earned more than that amount and half earned less. The lowest 10% of dentists earned less than $68,400, and the top 10% earned $187,200 or more. On the other hand, the median annual wages for dentists with specialties in May 2015 were as follows:

- Equal to or greater than $187,200 for orthodontists, mean annual wage of $221,390 (Bureau of Labour Statistics 2016a)
- Equal to or greater than $187,200 for oral and maxillofacial surgeons, mean annual wage of $233, 900 (Bureau of Labour Statistics 2016b)
- $119,740 for prosthodontists, annual mean wage of $161,220 (Bureau of Labour Statistics 2016c)
- $171,000 for dentists of all other specialists.

Keep in mind that earnings vary according to the number of years in practice, location, clientele pool, and hours worked (GollegeGrad 2015). Although in most countries a specialist has higher earnings than a general practitioner, pursuing a specialist degree primarily to obtain financial gains may be a very expensive or inconvenient mistake if at the end you do not finish practicing, or you do not feel that you are fulfilling your potential. The public deserves the most advanced treatment dentistry can offer from committed practitioners.

Thus, it may well be that after all of these considerations, a GDP might fit better with your career path. As only about 10% of dental practitioners specialize (Solomon 2015), it is not surprising that the majority of dental students do not plan to specialize right after graduation. They may plan to do postdoctoral non-specialized general dentistry programs such as General Practice Residency (GPR), Advanced Education in General Dentistry (AEGD), or to enter private practice without specialization (Dhima et al. 2012). Many students also postpone the decision to specialize for a few years after finishing their degree as an oral health professional. This may allow students to better explore their options without committing to a single specialty.

Whatever you decide, do not rush. Studies on health care professional's decisions on higher education have identified that maintaining work and family life balance is

an important concern and such concerns often dictate the decision to specialize in a postgraduate education.

6.5 The Bottom Line

Although most dental specialties are tailored to a private practice model, some will enable work at government or administrative realms, such as dental public health. Most dentists work full time, including evenings and weekends, to meet their patients' needs, although others chose to work a few days a week only. As we have discussed above, a dental specialist requires additional training. In some countries, entering a specialty program is very competitive, as only few openings per year may be available. The programs often require an interview and reference letters. Again, a discussion with an existing specialist can offer good advice on how to maximize opportunities.

Although hundreds of hours are required to train a dental specialist, any oral health professional should hold the following necessary qualities (Sask Careers 2016):

Communication Skills Communication is an essential component in the daily activity of an oral health professional. Excellent communication skills are necessary so that effective transmission of the message can be established with patients and their families, with other members of the dental community and with other health care professionals.

Detail Oriented Attention to detail is very important in dentistry. This is required to provide the best treatment and correct medication for the patient, as well as to make a conscious effort to understand causes instead of just the effects.

Dexterity Manual dexterity is deemed important to dentists because they work with powerful instruments in a small, limited area. Your hands are your tools!

Leadership Skills Working as your own boss most of the time and running a dental practice requires you to learn how to run a business and lead your staff in a respectful way.

Organizational Skills Dentists need to have strong organizational skills. This includes keeping accurate legal dental records of patient care. Strong organizational skills are also critical for the dental clinic business setting.

Patience As oral health professionals may work for long periods of time with patients who need extra attention and to whom very detailed oriented work is done, patience is a characteristic that oral health professionals need to foster.

Physical Stamina The physical work of a dentist might be exhausting as they conduct a number of procedures during the day. Sometimes dentists need to physically position themselves in ways that are not very comfortable; stress management and emotional support are required.

Problem-Solving Skills Some patients will go to a dental office with difficult dental problems that will require great problem-solving skills and shared decision making from the dental team. Oral health professionals need to evaluate patients' signs and symptoms and choose collaboratively with the patient the most appropriate treatment and course of action.

Empathy Empathy is a very important component of the professional–patient relationship, particularly in dentistry. Empathy can be defined as the "*ability to understand a patient's experiences and feelings and the capability to communicate this understanding*" (Sherman and Cramer 2005).

6.6 Conclusion

Dental specialties are important for the profession of dentistry and the public at large. General dentistry can solve most problems; however, sometimes patients will need more complex treatments that require the work of an oral health specialist. Although many students might not specialize right away after their graduation, they must appreciate the importance that specialists have for the oral health profession in general. The issue of mobility for specialists is something that some countries are already working on, and gap-training programs for qualified specialists are already in place such as in Canada (Association of Canadian Faculties of Dentistry 2016). As a final thought, general dentistry remains a very important aspect of dentistry. However, depending on the patient's case, a specialist will be necessary to address the complexities involved in the holistic care.

Authors' (MB and DA) Personal Reflections on Being and Becoming Specialists
The decision to become specialist is very personal, and it will depend on your life goals and what you are going through in your life. Many dentists may want to become specialists, but due to their life conditions they may not be able to pursue this goal. Finances and life circumstances will definitely influence a decision to stop a dental practice after a few years to start a dental specialty program. On the other hand, dentists may want to continue straight to a specialty program just because they may not want to stop studying dentistry right after graduation.

We have learnt a lot during our specialty programs (DA) and postgraduate education (MB). We had many sleepless nights just trying to figure out what needed to be done for a patient or what we should do to create a dental public health graduate program that would improve access to oral health care for vulnerable populations (http://www.dentistry.ubc.ca/mph-dph/about-the-program/; Brondani et al. 2015). We spent a lot of time away from our loved ones, while our academic and financial

investments were put towards the goal of specializing or learning more about a given area of dentistry. However, the satisfaction that came after we were able to figure things out was so exhilarating that it made us forget about the troubles and the things that we might have missed in our lives while we were doing our specialty programs; we are both passionate academics and researchers who opted to work very part-time as a dentist or dental specialist in private practice, both in Canada. Regardless of your area of specialty or career path, the journey of self-reflection is permanent and much needed.

Appendix

Prosthodontics
If you are more inclined to work with complex oral rehabilitation, prosthodontics should be a good choice. This specialty is concerned with the diagnosis, restoration and maintenance of oral function, comfort, appearance and health of the patient by the restoration of the natural teeth and/or the replacement of missing teeth and contiguous oral and maxillofacial tissues with artificial substitutes.

In addition to a dental degree, prosthodontics requires a further two or more years of postgraduate specialist training.

Oral and Maxillofacial Surgery
If you have more interest in the medical field associated with dentistry, oral and maxillofacial surgery may be up your ally. This specialty includes the diagnosis, surgical, and adjunctive treatment of disorders, diseases, injuries, and defects, involving the functional and aesthetic aspects of the hard and soft tissues of the oral and maxillofacial regions and related structures.

In addition to a dental degree, oral and maxillofacial surgery requires 4–6 years of postgraduate university training. However, in some jurisdictions oral and maxillofacial surgeons require degrees in both dentistry and medicine.

Endodontics
Thinking about working within the minutia and intricacies of the insides of a tooth? Endodontics may then be a desirable choice. Endodontics is the branch and specialty of dentistry concerned with the morphology, physiology, and pathology of the dental pulp and periradicular tissues. In addition to a dental degree, endodontists require an additional 2 or 3 years of postgraduate university training.

Endodontists are root canal treatment specialists. They have additional training, experience, and formal qualifications in root canal treatment/therapy, apicetomies, microsurgery, treating traumatic injuries to teeth, and oral facial infections. This study and practice encompasses the basic clinical sciences, including biology of the normal pulp, and etiology, diagnosis prevention, and treatment of diseases and injuries of the pulp and associated periradicular tissues. Endodontists are also specialists in apical microsurgery.

Orthodontics and Dental Facial Orthopedics

If your passion is making sure teeth are harmonized and "in order," perhaps you should consider orthodontics and dentofacial orthopedics. This is that branch and specialty of dentistry concerned with the supervision, guidance, and correction of the growing or mature dentofacial structures and the diagnosis, prevention, and treatment of any abnormalities associated with these structures.

Dento-maxillofacial anomalies are highly prevalent in the population, which makes them a major public health problem, requiring highly trained specialists to the practice of orthodontic and orthopedic techniques for the prevention interception and corrective treatment of these anomalies.

After a dental degree, depending on the jurisdiction, an orthodontist completes an additional 2–3 years of specialist training to qualify as specialist.

Periodontics

Do you feel you have a hidden talent for plastic surgery at periodontal (gum) level and do not mind blood, maybe lots of it? Well, periodontics may be for you. Periodontics is that branch and specialty of dentistry concerned with the diagnosis, prevention, and treatment of diseases and conditions of the supporting and surrounding tissues of the teeth or their substitutes (i.e., implants) and the maintenance of the health, function, and aesthetics of these structures and tissues and management of complications associated with dental implants (e.g., treatment of peri-implantitis).

After a dental degree, a periodontist completes an additional 2 to 3 years of university training.

Periodontists work with other oral health providers, particularly dental hygienists and other oral health specialists related to prosthetics, endodontics, surgery, and orthodontics. The dental hygienist (DH) has a key role in the collaboration with the periodontist, since once the patient has been evaluated and treated by the specialist, the DH may be responsible for the control of the patient and knowing when to refer them back to the specialist.

Pediatric Dentistry

Remember that child that required a special skill and aptitude to be dealt with at the dental chair? Look no further: pediatric dentistry it is. This specialty of dentistry is concerned with providing primary and comprehensive preventive and therapeutic oral health diagnosis, care, and consultative expertise for infants and children through adolescence, including those of all ages with special care needs.

Pediatric dentistry is a specialty closely associated with orthodontics, as pediatric dentists detect possible abnormalities in the position of the jaws or teeth and refer to the orthodontist. Because dental and maxillofacial trauma is most frequent in children, pediatric dentists are also responsible for treating traumatisms. Pediatric dentistry training usually requires 2 or 3 years of additional postgraduate training.

Oral Medicine and Oral Pathology

If you cannot get away from biopsies and like to use your deductive and inductive skills, you should consider oral medicine and pathology. This is the branch and

specialty of dentistry concerned with the diagnosis, nurture, and primarily nonsurgical management of oral, maxillofacial, and temporomandibular diseases and disorders, including dental management of patients with medical complications. Oral medicine and oral pathology are two applied components of this specialty.

In some countries these specialties are separated in two. Oral medicine and oral pathology specialists should possess dental degrees and have completed specific training of no less than 3 years' full-time.

Oral and Maxillofacial Radiology

Feeling those images all inside your head? Well, they are not! Oral and maxillofacial radiology is that branch and specialty of dentistry concerned with the prescription, production, and interpretation of diagnostic images for the diagnosis and management of diseases and disorders of the craniofacial complex. Although all specialties have changed in recent years, maxillofacial radiology has changed to include, tomography, ultrasound and magnetic resonance imaging. More recently, an important advance was the emergence of digital radiology. Digital radiology allows a dental radiologist to basically work from anywhere in the world, as well as to receive consultations from patients and oral health professionals who are physically separated from the radiologist.

The training of a radiologist includes the fundamental measures of radiation protection, physics, pathology, management of imaging equipment, knowledge and application of radiological techniques, and interpretation of the images obtained. Radiologists can work in private and public clinics or hospitals. A typical day for a radiologist includes the interpretation of images and meetings with dentists to discuss clinical cases. Radiographs and exams are usually taken by auxiliary staff.

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Part III

Non-clinical Career Path in Oral Health

Non-clinical Oral Health Practice Specialities

7

John Clement, Sergio Uribe, and Rodrigo J. Mariño

Abstract

Dental public health and forensic dentistry are two key non-clinical dental specialties, described in this chapter. Dental public health is defined as the use of public health tools and skills for the prevention and control of oral disease, and the promotion of oral health, at the community level. Many dental health profession students do not consider the specialty of public health. Graduating oral health profession students are often unaware of the scope of this speciality, which can include working as oral health epidemiologists, health promotion/health educational experts, dental educators, planners or managers of health services. Dental public health specialists may work in universities, public health care provider organisations, health insurance and private health care organisations, as well as international organisations such as the World Health Organization. The primary role of a forensic dentist is to identify human remains, particularly following mass disasters, such as bushfires and tsunamis, or mass killings. However, this specialty has broadened considerably in recent times to include assessment of orofacial trauma and injuries inflicted by dentition, as well as forensic investigation of dental records. This work is highly intellectually challenging but can involve the stress of working in difficult settings and with disturbing subject matter.

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7.1 Introduction

The oral health career path can take many directions, with tremendous opportunities for post-graduate training and education and a wide range of careers available for qualified oral health professionals. The literature indicates that graduates consider many aspects when choosing a career in oral health. Worldwide, several studies have focused on the motives of oral health professions students for choosing their career (Miers et al. 2007; Crossley and Mubarik 2002; Vigild and Schwarz 2001; Gallagher et al. 2007; Mariño et al. 2012; Mariño et al. 2014; Gambetta et al. 2014). Findings from these studies suggest that although a service orientation and the influence of family and friends remain key factors in choosing a health profession, students also look for a career which matches their interests and attributes, as well as offering professional values (i.e. altruistic motivation to care for people) and rewards (e.g. job security, independence, financial benefits, etc.).

It is apparent that each generation has different approaches to work, with "Generation X" (born between 1961 and 1981) valuing flexibility whereas older workers value stability (O'Bannon 2001). The literature on career choice notes that in comparison with earlier generations, young adults in the twenty-first century are delaying making career choices and switching career paths and fields of study (Feldman 2003). Feldman and Whitcomb (2005) argue that delay in career choice amongst young adults may be due to the wide range of criteria they seek in a career. We know that in recent years, educational debt seems to have an influence on dental graduates' career choice (Walton et al. 2006; Saeed et al. 2008). In view of the reality of educational debt, it is not unexpected that preferences will be more often for clinical specialties and less for pursuing a career in non-clinical specialities (i.e. dental public health). This may also be due to a number of other reasons such as lack of clinical role models, less exposure to information on these specialties and limited opportunity to treat patients, unlike in other oral health specialties (Dhima et al. 2012; Rupp et al. 2006).

In this chapter, the focus will be on non-clinical specialities, namely public health dentistry and forensic dentistry. The authors will describe these specialisations, what they offer and the range of activities somebody specialising in them could be involved with. The chapter will also briefly describe their scope of practice and training around the world, with emphasis on its practice and training in Australia. As in the previous chapters, there will also be profiles of oral health professionals working in these specialties. These discussions share valuable information and give insight into the life of specialists (Critchlow and Nanayakkara 2012). Interested oral health professionals should be able to compare their interests and skills with those in the profile to determine what specialty options may be more suitable for them. This is important as a lack of information may well be one of the factors deterring students from making informed decisions in choosing a career path in oral health (Rupp et al. 2006).

7.2 Career in Dental Public Health

The Oxford Textbook of Public Health defines public health as:

> . . . the art and science of preventing disease, prolonging life, and promoting health through the organized efforts of society. The goal of public health is the biologic, physical, and mental well-being of all members of society. Thus, unlike medicine, which focuses on the health of the individual patient, public health focuses on the health of the public in the aggregate (Detels et al. 2009).

The use of this definition helps to identify the realm of dental public health. That is, the use of public health tools and skills for the prevention and control of oral disease and the promotion of oral health at the individual and community level. Dental Public Health also deals with the collection, management and distribution of epidemiological health information in support of patient and population education, practice, research and effective public health policies and supports health care administration and the provision of oral health care delivery and patient management. The scope and competencies of Dental Public Health is continuously being reviewed. For example, in the USA, the latest review was conducted in 2016 by Altman and Mascarenhas (2016).

Oral diseases and conditions are recognised by the public and government as a major health and public health problem, often resulting in expensive and extensive treatment, restricted activities, work loss and other social, psychological and economic consequences. While a great majority of graduating dentists pursue clinical practice to address oral health challenges in individuals, one non-clinical career option is to look at these challenges at the population level (i.e. dental public health). Dental Public Health can offer a rewarding, dynamic and exciting opportunity to fulfil aspirations in the overall oral health profession for those considering becoming oral health epidemiologists, health promotion/health education experts, oral health educators in public health, planners or managers of health services.

Public health work involves collaborative efforts between individuals, policymakers, institutions and even between countries. For public health practitioners, it is relevant to handle abilities of networking, negotiation, influencing and capacity building, to mention a few. Public health work, as well as oral health practitioner, also involves working with, and for people from many different walk of life, cultural backgrounds, religions, races, ages, etc. However, different to clinicians, the work is not done "one person at a time", but for the good of the largest number of individuals, by for example, clarifying best clinical practices, and could be implemented in different settings and environments (e.g. directly influencing policy or influencing a person holding government). Thus, the practice of Dental public health includes a variety of roles and disciplines. This diversity is central to public health practice.

There are many organisations that employ (dental) public health specialists, including universities, public health care provider organisations, health insurance companies and private health care organisations, as well as international organisations such as the World Health Organization. Each of these organisations seeks to serve, address and

reduce the economic and social burden of diseases. Other DPH specialists work in private companies, foundations, or research institutions (e.g. National Institute of Dental and Craniofacial Research (NIDCR); Centers for Disease Control and Prevention). A recent survey on DPH in the USA indicated that almost 60% of DPH specialists worked in academia (Mascarenhas and Altman 2016). Another 20% worked in government agencies and 6.5% in health care provider organisation. The remainder (13.8%) worked in professional associations, research agencies or organisations, or in "other" organisations or were Dental Public Health consultants. Dental Public Health specialists' roles can be grouped into administrative, clinical care, teaching, research, policy and programme planning and evaluation (Mascarenhas and Altman 2016).

Different countries offer several different pathways for post-graduate training in dental public health. The most common and preferred route is the attainment of a master's degree, such as MSc in Dental Public Health (e.g. Australia, UK). However, there are also post-graduate degrees in public health. In other countries, such as USA, in addition to a master's degree, there is a need to complete a residency programme in dental public health and pass an exam, to be able to practice as a DPH specialist. Completing a PhD may also confer eligibility to become a registrar in dental public health. However, those who intend to do a PhD programme after their honours bachelor's degree may find PhD research extremely challenging compared to those who complete their master's degree before pursing their PhD program.

Dental public health can be an exciting career path for oral health professionals. It offers so many opportunities to grow professionally and develop within the profession in many different and interesting ways. At the individual level, patients will always require high-quality oral health care and this is a core issue itself. Oral health care is becoming increasingly complex and expensive and we need innovative strategies to deal with it, where dental public health has a role. However, there is also a need to help the individual to maintain his/her state of well-being via health promotion and disease prevention programs and shaping social policies.

This is the responsibility of public health to respond to health problems and challenges working through a population approach. Currently, societies are facing the needs of an older population, where a larger number than ever before is becoming frail and vulnerable, most of them with a natural dentition, which need ongoing care. At the other end of the life cycle, we have the challenges of, for example, early childhood caries. In between lie a number of other specific populations, whose members also require oral health and health care.

Goals in dentistry cannot be reached solely on the basis of providing clinical treatment. As for any chronic disease, health promotion, self-managed disease preventive measures and population-based programmes are important for achieving better oral health outcomes. Public health encourages self-reliance and personal decision making and accessing relevant resources (empowerment), partnership, and taking action using innovative approaches and technologies to address health inequalities and the quality and delivery of oral health care.

7.3 Career in Forensic Odontology

Forensic Odontology was defined in the 1980s by Keiser-Neilsen (1980), a prominent practitioner of the discipline, as:

> that branch of odontology which in the interests of justice deals with the professional handling and examination of dental evidence and with the expert interpretation and documentation of the findings made.

Whilst people have drawn upon the individualising features of dentition since ancient times to identify both the living and the dead, the discipline only developed a professional basis as a result of a catastrophic fire at a charity bazaar in Paris in 1897 that killed 126 people in spectacular circumstances. Several of the most prominent female members of the European aristocracy lost their lives. News of the event quickly spread around the world because prior to the societal changes that followed the Great War of 1914, this was a very significant event. For the first time, dental records were used in a systematic way to identify the dead. A short time later, recognising the significance of these events, Oscar Amoedo, a Cuban-born American-trained dentist on the staff of the dental school in Paris, wrote the first doctoral thesis on the intersection of the interests of the law and dental evidence (Amoedo 1897).

Forensic dentistry is also closely related to the development of dentistry in Chile. In 1897, Dr Germán, Valenzuela, who received his degree from a dental school attached to the School of Medicine, University of Chile, went to the Dental School of Paris where he obtained the degree of Dental Surgeon. Upon his return, he was appointed the first director of the Dental School, University of Chile.

During his period as director of the dental school, Dr. Valenzuela extended the curriculum to three years and also managed to require a high school entrance to the profession. However, his most relevant achievement and legacy was the use of the forensic dentistry skills he had acquired in France for the resolution of the crime at the German High Commission in Chile in 1909 known as “Becker’s crime”.

After an examination performed by two German doctors, the police had identified the murdered man as the German chancellor, Guillermo Becker, due to the belongings he carried: the gold ring, the watch and the collars, among others. Suspicion fell on the doorman of the building, who was not located. His absence and the fact that the safe of the Legation was found open, and a small fortune taken, confirmed the doorman’s reason for the crime.

But Dr. Valenzuela compared the chancellor’s clinical records with the dentures of the deceased and found that there was no correspondence. It was determined that the body was not the chancellor’s, as there was no dental work, and an almost complete dentition. This was a spectacular turnaround. The accused became the victim and the supposed victim was revealed as the true perpetrator. In recognition of his intervention in identifying the perpetrator and for saving Chile’s reputation, the Chilean government offered Dr. Valenzuela a financial reward, which Dr. Valenzuela asked to be used for the construction of a modern Dental School. In September 1911, the new Dental School building was inaugurated and operated for almost 100 years in the service of the training of dental surgeons.

The principal focus of the discipline at that time was the identification of the dead by a comparison between ante-mortem dental records and post-mortem findings. Whilst this still continues to be the case, the role of the practitioner has broadened considerably to include assessment of orofacial trauma and injuries inflicted by dentition, as well as forensic investigation of dental records. Nevertheless, the role of the forensic odontologist in identifying human remains, particularly following mass disasters or mass killings as a result of warfare or civil strife, has never been more important.

A career in forensic odontology now requires specialist training, and in many countries the discipline is recognised as a formal specialty within dentistry. Practitioners must have broad experience of clinical practice, ideally extending beyond the geographical region in which they live. A good grasp of anatomy (both human and comparative) and anthropology is also a prerequisite and a sound grasp of the local laws and professional regulatory frameworks is essential, with special emphasis on the workings of the coronial investigatory system. Perhaps the most important attribute to develop is a keen understanding of the context in which one has to work. This assumes particular prominence when working overseas in countries with different laws and customs, as often occurs in disaster victim identification investigations.

It must be emphasised that forensic odontology will always exist as a micro-specialty. The day-to-day workload only requires the services of a handful of practitioners in each state and territory. The conundrum then is how to strike a balance between the resources needed routinely yet at the same time being able to ramp up resources with high and current skill levels in times of emergency, as occurs after natural disasters such as fires, earthquakes and floods, and, increasingly, terrorist events, when there is an urgent need to identify many human remains very quickly.

Further, with some nations (e.g. Australia) playing an ever-increasing role internationally in regions of war and other conflicts, countries must develop and retain the capability for long-term overseas deployment of forensic odontological expertise for the investigation of mass killings and other atrocities. Forensic Odontology has often assisted in disaster victim identifications. For example, in the case of bushfires (e.g. 2009 Victorian Black Saturday Bushfires) and the 2004 Indian Ocean Tsunami (Chawla 2005).

It should be emphasised that a decision to specialise in any form of forensic pathology, of which forensic odontology is frequently a part, should not be taken lightly and should certainly not be based on the image portrayed so unrealistically in TV dramas. The work is highly demanding intellectually, as no two set of circumstances are the same. Also, unlike other clinical practice, there is often an intention by someone to mislead the clinician/investigator. This presents certain challenges, but also makes the work very rewarding. Furthermore, the circumstances in which the forensic odontologist has to work are frequently very stressful. Stressors vary from the unpleasantness of working with badly decomposed remains, to having to reconstruct issues of causation of injuries and thereby imagining intent on the part of assailants, to dealing with victims of sexual assault, or working in unfamiliar situations and amongst people with unrealistic or unreasonable expectations or with different values. It is, therefore, a profession for people with good coping strategies, emotional resilience and a very strong commitment to confidentiality.

7.3.1 Forensic Dentistry in Australia

In Australia, there are two possible routes to specialist status. The first is via university, where experienced dentists undertake postgraduate education and training in a dental school or department of pathology with access to a mortuary. Practical experience can be gained under supervision and successful students gain a master's degree. The alternate route is via a training programme in accredited forensic institutions via the Royal College of Pathologists of Australasia (RCPA). This is akin to many other clinical specialist pathways and involves trainees in supported registrar positions. Both pathways exist to promote advancement of knowledge and good practice by promoting and encouraging high levels of expertise and reinforcement of high ethical standards.

Forensic odontologists around Australia had the option to apply for specialist status in their field and to provide comprehensive documentary evidence to support such applications. Nationally, about 25 practitioners took up the opportunity to become registered as specialists in the field of Forensic Odontology and to use the title. Specialist status in Forensic Odontology does not prevent General Dental Practitioners being involved in Forensic Odontology in any way. The regulations only prevent them from using the title of Forensic Odontologist, as this is now a protected title, restricted to those who are registered to use it.

This is essential if important national capability, coupled with the ability to operate internationally when required, can be ensured into the future. This is particularly important in a country that is seen as a source of well-trained expertise and physical resources for Disaster Victim Identification (DVI) amelioration by our neighbours in the region of SE Asia and the Pacific Rim.

As the number of graduates emerging from the Royal College pathway will always be low, it will be important for Australian universities to continue with the education and training of experts in forensic odontology, preferable at 3-year masters or doctoral level, so that this national capability can be assured. Individual experienced specialists have been working closely with universities in their particular States to develop and implement such programmes.

Further, with Australia playing an ever-increasing role internationally in regions of war and other conflicts, the country must develop and retain the capability for long-term overseas deployment of forensic odontological expertise for the investigation of mass killings and other atrocities.

On 1 July 2010, a new body called the Australian Health Practitioners Regulation Authority (AHPRA) was created under a National Law, to provide administrative support to the boards (Australian Health Practitioners Regulation Authority 2015). From a practical point of view, this has meant that forensic practitioners do not need to hold registration in more than one State. Therefore, in the case of a national incident requiring Disaster Victim Identification utilising dental records and expertise, re-registration will not be necessary for forensic odontologists to work in another state or territory. This has important strategic ramifications.

In April 2017, the first programme in Forensic Odontology was accredited by the Australian Dental Council and approved by the Dental Board of Australia. This is the RCPA program. From 2010 until 2017, there was no pathway to specialist status. As

a result of this approval, the qualification equivalence pathway for specialist registration is now available for applicants who hold a qualification not approved by the Board (such as an overseas qualification) in forensic odontology specialty (Dental Board of Australia 2017).

7.4 Final Remarks

The objective of this chapter is to describe the scope of practice of dental public health and forensic dentistry and to present profiles of oral health professionals working in these two non-clinical specialities. Dental public health is defined as the use of public health tools and skills for the prevention and control of oral disease and the promotion of oral health, at the community level. The scope of this speciality includes working as oral health epidemiologists, health promotion/health educational experts, dental educators, planners and managers of health services. On the other hand, the primary role of a forensic dentist is to identify human remains, particularly following mass disasters such as bushfires and tsunamis, or mass killings. However, this specialty has broadened considerably in recent times to include assessment of orofacial trauma and injuries inflicted by dentition, as well as forensic investigation of dental records.

Graduating oral health profession students are often unaware of the scope of these two oral health specialities. In both cases, the work is highly intellectually challenging and can involve the stress of working in difficult settings and in the case of forensic dentistry, with disturbing subject matter. It is hoped that graduating oral health professionals become aware of the scope of these specialities.

My Personal Journey in Oral Health (Sergio Uribe)
I opted for dentistry after a friend pointed out that most of the science professors at the medical school were dentists. However, a turning point came in my third year when I discovered preventive dentistry. Although dentistry is a health discipline, oral health education is still very much focused on disease. I was fortunate to be exposed to great professors at university and working with them. I started to research on innovative approaches to prevent tooth decay, some of which are now validated by clinical trials. After graduating, I decided to specialise in dental radiology, calculating that it would allow me the greatest freedom to dedicate myself to research.

I believe a dental educator's duty is to develop a healthy scepticism, and the students' critical approach to information, so that they can adopt advances that will allow them to deliver the best possible treatment to their patients. I also believe that a researcher has a duty not only to communicate and publish his/her results but above all to communicate these results to the community at large.

During my oral health training, access to information was made routine through Medline and internet access to databases and electronic journals, but I was surprised to learn that only a small part of routine dental treatments were based on good quality scientific evidence. Since then, I have devoted myself to trying to close the gap between academia and clinical practice, in what is now known as evidence-based

dentistry. These days, the social media facilitates this task and today I write routinely in blogs, forums and Twitter, which I see not different as my clinical expertise.

When I began my oral health education, dental disease was primarily attributed to the result of "bad" bacteria or uncooperative patients who did not follow their dentist's instructions. We now have strong evidence that oral diseases are complex chronic diseases, more associated with behaviour, habits and socioeconomic status than bacteria or the use of a particular toothbrush. Nowadays, oral diseases and conditions are seen as the biological expression of a complex interaction of social problem whose solution is in the hands of economists, politicians, social leaders and secondarily of oral health professionals. "Show me your teeth and I'll tell you who you are!" declared preeminent eighteenth-century naturalist George Cuvier. Now we can say: "show me your teeth and I will tell you how much your family earns", or "let me count your fillings and I will tell you how often you have been attending the dentist".

As oral health professionals, we ought to maintain a person's oral health, not only by applying rehabilitative treatments but also our training must incorporate topics that allow us to understand how humans make decisions. Moreover, if I could go back to my early studies, I would opt for a speciality closer to social sciences, which include training in economics, statistics and human behaviours, because I came to understand that these disciplines are key improve the health and the quality of life of the population and in so doing deliver oral health care to millions around the world, but also in informing and changing health policies, promoting health of the population.

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Non-traditional Careers in Oral Health

8

Leonie M. Short, Luis Castro, and Rodrigo J. Mariño

Abstract

This chapter will look at career paths followed by oral health professionals who do not follow the more established paths, but use their oral health backgrounds to transition into unexpected careers. These paths are at the intersection of diverse disciplines, for example, careers in community organisations, government, health administration, policy making and government research. This chapter describes the interests, skills and abilities, competencies and goals needed for professionals to pursue these paths. Oral health professionals are encouraged to consider how their education, training and experience can be relevant to a wide variety of alternative fields. Personal reflections also provide an insight into one oral health professional's transition from clinical work to academia and politics and from clinical work to health anthropology.

Luis Castro was an active contributor to this publication. Sadly, he passed away in 2016 before the publication was complete. Luis was very enthusiastic about the book, in fact, he was one of the first to embrace the project. We dedicate this chapter to his memory.

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8.1 Introduction

Most oral health professionals choose to work in clinical careers—this is true for dental therapists, dental hygienists, oral health therapists, dental prosthetists, dentists and dental specialists. Some oral health professionals will pursue further training in clinical aspects of their work; this is especially true of dentists wanting to be dental specialists or of dental hygienists wanting to obtain additional skills as dental therapists (Yoder and De Paola 2011). A smaller proportion of these graduates will move into administrative or academic positions but these will still be associated with dental schools or faculty, dental corporations and government departments.

However, some oral health professionals have forged career paths in what might be called "non-traditional" areas. Throughout history there have been politicians, writers, musicians and sports people, to name a few, who have been oral health professionals. These professionals utilise their knowledge, skills and experience in oral health and apply it to broader health, community or government contexts. They can see that their training and experience in oral health can translate to many other disciplines; they have a broader view of health per se and are interested in the for-profit and not-for-profit health services, community groups and organisations, professional associations and health systems of particular states or nations.

There are oral health professionals who have been presidents of nations (e.g. Héctor Cámpora in Argentina and Saparmurat Niyazov in Turkmenistan) and many who are members of Parliament or hold other public offices (mayors, governors, ministers, etc.). The coach of Iceland's soccer team, Dr. Heimir Hallgrímsson, is a former dentist who led the national team to play the quarter-final of the European soccer cup (UEFA Euro 2016) for the first time. The late Dr. Ramon Rojas, who held a world record for base jumping by jumping 4.100 m, was a dentist by training. Unfortunately, he died in 2015 in Switzerland training for the world championship. Alfonso Leng, a periodontist, was the founding chair of periodontics at the University of Chile in 1924 and later Dean of the Faculty. He was also a musician, who in 1957 was awarded the national prize for art. As a musician, he is remembered for the *Death of Alsino* (1922) a symphonic poem (www.youtube.com/watch?v=Zv2sPUDsTbQ) and the beautiful piano pieces, the *Doloras* (1914) (https://www.youtube.com/watch?v=PBF6VUllNuY).

This book has presented and described a few alternative career path available to oral health professionals, which might be considered as non-traditional. Consider that few oral health professionals work in the public sector, or conduct research, or work in the armed forces, etc. All these may be grouped under non-traditional career paths to standard clinical work. However, this chapter will look at some of the career paths followed by oral health professionals who did not follow those more established courses, but used their oral health backgrounds to excel in diverse areas of human knowledge or activity, even those that may not be associated with oral health, while using their knowledge, skills and experience acquired through their professional training. These paths are at the intersection of diverse disciplines, for example, careers in community organisations, government, health administration, policy making and government research. This chapter will describe the

interests, skills and abilities, competencies and goals needs for professionals to pursue these paths.

8.2 Why Pursue a Non-traditional Career in Oral Health?

Most people do not get involved or interested in a particular issue until something affects them personally. This is as true for Politics with a capital "P" as it is for health services or education. People often realise that a specific service is missing or not available or that something in the system needs to change in order for more equitable access, opportunity or outcomes. This may affect them personally, a close friend or a relative. Examples include the need for more research to cure breast cancer, wheelchair access for students with a disability, laundry facilities for the homeless and driving lessons for newly arrived refugees. These personal interests or realisations can be the catalyst for someone to learn how a system operates and, more importantly, how to make changes to a system to benefit a particular disadvantaged group in society. In this way, an understanding of social justice is a keen motivator for social change.

Other people may know someone working in a non-traditional area, and this may be the impetus to become interested and eventually move over to this line of work. No matter what the motivation, when contemplating such a change, the oral health professional needs to weigh up the loss of "recency of clinical practice" with the gain of learning about, and contributing to, another aspect of society. For those who believe that they have already mastered the clinical requirements of practice or for those who have lost the desire for day-to-day clinical practice, an opportunity for a change of environment can be refreshing and rewarding. This career change is easier for some oral health professionals than for others. And for some, it may take place early in their careers while for others it might come much later and even experienced oral health professionals have possibilities to move into less traditional paths.

A non-traditional career path could be also something you like to do outside work. For example, in Chap. 3, the personal journey of a dentist who enjoyed writing in his free time, as a hobby, is presented. Now he is an award winner whose fiction writing is in many ways connected to the profession. Another example would be from probably one of the most successful screenwriters in the Chilean cinema, Julio Rojas, who each day combines his clinical activities with his passion for writing scripts (Cinechile 2017).

Another important factor in a career change is the ability to calculate and take risks. For the risk-adverse, the maintenance of a clinician role will be paramount. But for those who are willing and able to take a risk, a foray into a non-traditional career could open up many more rewards and opportunities.

8.3 How Would an Oral Health Professional Benefit from a Shift to a Non-traditional Career?

An oral health professional would benefit from his/her involvement in a non-traditional dental career by being able to greatly broaden their knowledge, skills and experience. For example, learning about how policies are developed, how community groups are managed, how to advocate and lobby senators and members of parliament, how to write submissions for a public enquiry and how to write a research grant proposal are all skills, abilities and competencies that are highly valued and take time to develop.

Most importantly, one's dental training, education and clinical practice provide an excellent foundation for an array of career paths. Core skills developed by oral health professionals which translate into diverse fields include knowing how to treat all persons with respect, the ability to work as part of a finely tuned team, understanding the importance of policies, such as infection control and dental records, acknowledging financial imperatives and highly developed communication skills.

Oral health professionals should never underestimate their knowledge and skills and how these can be utilised in other careers. An oral health profession's degree may prepare you for a number of careers pathways, including those that considered non-traditional. The way in which oral health professional consider their clinical and/or career pathways has important implications as it will strongly influence what he/she can do both inside and outside his/her field of professional expertise. The area of action and intervention of an oral health professional should not be confined to clinics or health centres or even in a hospital. An oral health professional can embark on alliances with other groups on social and health issues. This must be seen not only as a career move, but as part of oral health professionals' community health responsibility and advocacy role for both the profession and overall community.

8.4 How Would an Oral Health Professional Benefit His/Her Patients and the Community?

Many oral health professionals can benefit his/her patients, customers or the wider community in diverse ways. Examples in Australia have included an oral health professional who became an accountant, using her knowledge of the dental industry to give her useful insights into financial matters for a range of health professionals. Another became a manager in a health fund and then transferred her skills to work as a public servant in the state government. An oral health professional who was appointed to various government boards went onto work in fund raising for a major teaching hospital and in the allocation of research grants. And in an unexpected shift, a Queensland dental therapist established a fitness clothing company with her husband, which has become a successful global brand.

Oral health professionals have also made successful transitions into unexpected careers, while using their oral health expertise and training. For example, a dental therapist who studied orofacial myology and now works assisting patients with

issues such as airways, tongue tie, childhood craniofacial development and the effects of feeding and sucking habits on orofacial development. An oral health therapist who completed a Master's degree and was employed in health promotion began working in a programme to promote physical activity.

Other examples include a dentist who became a manager in a health fund and is now Director of Oral Health Services in a Local Health District in Sydney and a dentist who worked for the World Health Organization and the Global Child Dental Fund overseas on projects to improve oral health. As mentioned before, throughout history there have been many examples of oral health professionals who were able to combine and utilise their knowledge, skills and experience in oral health for the good of the people.

8.5 What Type of Education and Other Experience Does an Oral Health Professional Need to Follow This Path?

Non-traditional career paths may require knowledge and skill in several areas, and depending on the path that one travels, further education may or may not be necessary. For example, for a career in politics, membership and participation in a political party and involvement in community organisations are more beneficial than a degree in politics or law. Health is a fundamental human right, and an individual's aspiration, as such, is everybody's business. Oral health professionals need to use any available opportunity to ensure that oral health promotion programmes and oral health care services can achieve the expected effect. This means that oral health professionals are well placed to work as health advisors to politicians, who usually do not have a degree in health and, therefore, are not "experts" in health. The American Dental Association runs workshops that prepare interested oral health professionals to run for office (American Dental Association 2016).

For those whose want to work on for-profit or not-for-profit boards, completion of a company director's course is mandatory. Organisations such as the Australian Institute of Company Directors (AICD) offer a range of courses for these purposes as well as opportunities for networking with company directors (http://aicd.companydirectors.com.au).

For those wanting to pursue a career as a public servant or with a corporation, a Master of Business (MBus) or a Master of Business Administration (MBA) would be helpful in terms of learning about corporate strategy, financial accountability, risk assessment and budgeting skills. Studying with persons with varying backgrounds will also assist in broadening your knowledge in a diverse range of businesses.

For those wanting to work in the public health sector, a Master of Public Health or a PhD would be excellent training (See Chap. 7). Oral health professional education includes components of public health training; it seems a logical extension for many of these oral health professionals to choose to work in the public health arena (Nathe 2013). Again, studying with health professionals from a diverse range of disciplines will also increase your understanding of the wider health sector.

8.6 Pros and Cons

The main advantage of a change in career is the wish to contribute on another or different level to that of a clinician who treats patients on a day-to-day basis. While many oral health professionals are happy to continue being a clinician, there will always be others who develop a desire to do something different.

Finding out about a new career, undergoing further training or completing a higher degree may take time—so this goal is usually a long-term one where education is a path, not a destination (Auger 2014). Apart from the education, you will also need the right opportunity at the right time.

Moreover, in order to plan for a career change in non-traditional paths, attend seminars, webinars and presentations, visit relevant websites and talk to people already working in that field. Speaking to a person who can guide and mentor you would be ideal. Choose a person whom you admire, is approachable and is contactable in person, by email or over the telephone. Arrange to meet them for coffee to ask his/her advice on your career change. Interestingly, the more busy and important the person is, often the more they will be willing to assist you. His/her encouragement could be integral to your motivation and drive to change.

Talking to somebody already in that field allows you to explore and better understand what his/her career is about, discuss where the field is going, envisage what the current trends and needs are, how your current skills match those required in that field, inquire into possibilities, ask about the need for additional professional development, etc.

As for the disadvantages of pursuing a change in career, the main disincentive could be the time, effort and cost of further study. For some oral health professionals, particularly those with family responsibilities, you will need to choose a higher degree course that suits your circumstances (on- or off-campus) and budget (payment up-front or deferred payment). However, it is becoming more necessary to obtain further qualifications to keep up-to-date and relevant in a rapidly changing work environment.

8.7 Additional Resources (Readings, Websites, etc.)

Reading what other oral health professionals have achieved can also increase your confidence—if they can do it, then so can you. Borso (2011) outlines the careers of three dental hygienists: one in education, one in public health and one in the corporate sector. This chapter provides both inspiration and useful information.

Some individuals and organisations run courses that assist with career changes, for example the “Yes, You Can! Dental Influencers Business Incentives” course by DePalma (2012) and the workshop organised by the American Dental Association, mentioned before.

8.8 Final Remarks

This chapter describes some of the career paths followed by oral health professionals who did not take the more established paths, but used their oral health backgrounds, skills and knowledge to transition into unexpected careers. These paths are at the intersection of many diverse disciplines, from politics to education. This chapter discusses some of the interests, skills and abilities, competencies and goals needed for oral health professionals to pursue non-typical paths. Oral health professionals are encouraged to consider how their education, training and experience can be relevant to a wide variety of alternative fields.

Today's fast-changing trends in technology, globalisation and demographics are certainly affecting all professional career paths, including oral health professionals. The concept or expectation of a linear career path no longer exists for any profession. Although the aspect of patient contact provides more stability to the oral health career, still, this profession requires a workforce that is adaptable. This is where the concept of non-traditional career paths, as defined in this chapter, gains its relevance.

A Personal Reflection (Leonie Short)
As a school dental therapist in rural New South Wales in the late 1970s, I was very idealistic and realised quickly that dental services could be better organised and delivered to improve oral health outcomes in terms of reducing disparities. After becoming one of the first graduates from the Westmead School of Dental Therapy in March 1977, working in a mobile dental van and setting up a fixed dental clinic, I was appointed as a tutor at the Shellharbour School of Dental Therapy in 1980. At the same time, I joined the Australian Labor Party (ALP) and was active in health policy development. I was also an active member of my union, the Professional Officers Association, and worked on the first Award for Dental Therapists. Through my local member of parliament, I was given the opportunity to assist the Chief Dental Officer for NSW for 3 months. I moved to Sydney and saw how health policy was developed and put into action—I was hooked. I was also elected President of the Dental Therapists' Association of New South Wales.

Looking for ways to broaden my career path, I completed a Bachelor of Arts degree (with a double major in Education and Sociology) in 1985 and a Master of Health Planning in 1986. I then began an academic career, working first in the School of Sociology at the University of Wollongong before moving to the School of Nursing at the Armidale College of Advanced Education (CAE). The CAE soon merged with the University of New England and I was taught how to conduct research and apply for research grants. I then went on to teach and conduct research at another four universities in New South Wales and Queensland.

However, it was not until 2000 (20 years after I joined the ALP) that a public health colleague suggested I should "run" for the federal seat of Ryan in the upcoming election. Even though it was a safe Liberal seat, I took up the challenge to show what a good candidate I could be and how I could make a real difference to people's lives, especially in the fields of health and education. As fate had it, the sitting federal member resigned, a by-election was called and I resigned my position

at the Princess Alexandria Hospital with the University of Queensland—I was endorsed as the Labor candidate for the seat. After a hard fought campaign, we won the by-election with a swing of 9.67% against the government. It was the first time that the seat had been held by Labor (Short 2017). During my time in parliament, I was able to learn about many other policy areas, I grew in confidence, improved my public speaking skills, increased my networking activities and learnt how to fundraise. I relished my community activities and met some inspiring leaders.

However at the general election, 8 months later, we lost the seat to the Liberals. I was unemployed and in debt—in politics, winner takes all and the loser loses all. However, if I had my time again, I would still choose to be elected as the 56th woman to the House of Representatives in the 39th Parliament of Australia.

In my current role as Head of Course for the Bachelor of Oral Health at CQ University, I want the students to have high oral communication and public speaking skills as well as an understanding of oral health policy in Australia. My advice for new graduates also includes contracts and employment conditions (Short 2008). I greatly encourage students to look broadly at oral health and to consider the diverse contributions they can make to the community's health.

A Personal Reflection (Luis Castro)

Within the areas of human knowledge and research, one could have more than thousands of different interests, each of which provides a different understanding, but at the same time would add to knowledge in general. One of the interesting areas, which particularly stimulated my interest because of breadth of knowledge, is Anthropology of Health. This is because it embraces in an unparalleled fashion the evolution of human beings and also because of the techniques used in this area of inquiry. The way people understand the value of medicine and health, how people understand the need for health promotion and disease prevention, the evolution of how equipment and technologies, which are used daily in the clinics or in other medical settings, are incorporated, etc.

It is understandable that the knowledge gathered by the dentist in his/her clinic or in academia will have unparalleled repercussions in the users. This is because an oral health professional with greater and better knowledge is able to more easily deter and treat a greater number of pathologies that may arise or that are already established. The oral health professional can also act in areas that apparently are not influencing the treatment itself.

The core of academic issues always relates to what each of us mean by health. This definition, which has long been defined by the World Health Organization as a "state of complete physical, mental and social well-being and not merely the absence of disease or infirmity", is now beginning to be understood and embraced in the clinical conduct of health professionals. These areas of knowledge (i.e. anthropology) have stronger interconnections into what is understood as holistic in the sense that more and more seek for a general knowledge that recognises a human being as a whole and not as fragmented pieces and that it entails later, detriment in the process evolution.

Therefore, the need to act in the most varied aspects of humanity, in view of the urgent need to intervene in other areas, even though they seem to be far removed from the main focus—is the problem that brings the patient to his/her oral health professional for treatment!

The degree obtained at the beginning of our professional life allows the holder the possibility to working in one specific area. Nonetheless, over the years, this degree turns to be limiting and, in most cases, its holder evolves into another degree, or goes through other areas with the profession, alternatively it may end up being dragged to the set of elements that do not evolve. The need to academically evolve, begins when we want to explain to our patient something we are completely unaware of. The fragility of knowledge for those who listen to us attentively and when in constant interrogation, we must take measures capable of filling that gap in our knowledge. It is for us to look at our social and professional position and from this draw conclusions so that they can be or try to be more knowledgeable and better in their area. For that to happen, an engaging knowledge is fundamental, even in other and different areas.

As a dentist, and doctor in Health Anthropology, I understood that a knowledge of medical evolution, or an understanding of humans; in particular the investigation of populations referred to as marginalised or social minorities, would be an asset. This is an area little explored and understood.

To me, the possibility of conducting fieldwork in that area, learning and gaining from these precious experiences for personal and professional development, had been, without any doubt, one of the most enrichment accomplishments that can be achieved over the course of one's academic career.

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Career Paths in Organised Dentistry and International Organisations

9

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Abstract

Involvement in oral health organisations and professional bodies (e.g. professional associations, specialists' organisations, etc.) can end up influencing population oral health, law and health policies. Along with their advocacy roles, this can be seen as part of oral health professionals' responsibility beyond their clinics and dental offices. Oral health professionals need to use any available opportunity to work to ensure that oral health programmes and oral health care services can achieve the expected effect. This chapter provides a description of the options and discusses the many opportunities offered by local, state, national and international dental associations and specialist organisations. We also discuss the activities of international organisations (e.g. WHO, Med Sans Frontieres, etc.) that play an active and important role in improving health and well-being. An oral health professional can contribute to these efforts by providing specialised knowledge on this subject, for example, as an elected Board member, employee, intern or an oral health advisor at an international oral health programme. The chapter will also provide a description and reflection on how oral health professionals can be involved in these associations and organisations and include the authors' insights gained from personal experience working in these areas.

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9.1 Introduction

All oral health professionals are expected to become active members of their professions through participation in associations and bodies (e.g. local dentists, dental therapist or dental hygienist associations, dental special interest groups and study clubs, international associations of oral health professionals, specialists' organisations, oral health professions education organisations, etc.). These institutions, whether they are strictly local or at the national or international level, play a number of very important roles. Firstly, professional associations set standards of practice and behaviour for each profession, defining their codes of ethics as an expression of these standards. They also provide continuing professional education and development for the professions and thus provide them with the required opportunities to stay up to date in the various fields of their professional activities. Thirdly, through courses, conferences, magazines, publications, etc., they provide an up-to-date picture of national and global dental activity and current research in the field and connect members of the profession with one another. Finally, they can lobby public authorities and end up influencing laws and health policies to provide the best possible health outcomes for the public and also to develop and obtain the best legislation to enable good quality services for the patients and education for high standards of professional practice.

Other organisations (e.g. International organisations: The World Health Organization, *Medecins Sans Frontieres*, International Union of Health Promotion and Education, Public Health Organisations, etc.) have different objectives, but they also have an important goal in promoting health and in reducing health inequalities and contribute to strengthening of health systems, so all human beings can live a healthy life and productive life regardless of where they live. Oral health professionals bring expertise to the work of these organisations and help them develop and implement good programmes that impact on the oral health of many people—often those with the greatest inequalities, or in most need of help.

This chapter will provide a description of career options in these organisations and discuss the many geographical (local, state, national and international oral health associations) perspectives as well as specialist associations. In describing these career paths, the chapters will cover similar structure as previous chapters. Starting from a general overview of the career or career path in organised oral health professions and international organisations, it will outline entry and educational requirements, including skills, personal attributes, personality traits needed for success in the career, as well as a review of the responsibilities and advantages and disadvantages of working in each field. The chapter will also provide a description and reflection of how oral health professionals can be involved in international organisations.

9.2 Professional Organisations

Since the beginning of organised trades and professions, people with common occupational interests have formed groups and organisations to share knowledge around the performance of their work. In medieval times, these organisations became known as Guilds whose purpose was to look after the interests of their members and collectively hold and share knowledge related to their occupations. In current times, professional associations serve this purpose for oral health and other professions. The purpose of professional organisations integrates the diverse views of the professions and hold, protect and develop the knowledge of the discipline and its reputation. Professional organisations represent the intersection of academia, public policies and the needs of the population. They set standards for the profession, regulate the behaviour of their members to protect both the trust that the public place in professionals and their standards and advocate for their interests. Most oral health professionals are members of their professional association, and in many countries it is a condition of being registered to practice.

Standards of practice are usually expressed as codes of ethics that define the expectations of practitioners in that profession. They are generally built on the moral and ethical principles arising from the Hippocratic oath—respect for peoples' autonomy and right to participate in decisions about their treatment, doing only good and no harm and fair treatment on the basis of equity and equality. There are usually also principles of truthfulness, trust and commitment to patient care included in ethical codes. These codes of ethics are defined by the profession itself and used to underpin the quality of care provided and the reputation of the profession.

In order to ensure that high quality care is provided, professional associations also provide continuing professional education to enable practitioners to stay up to date with the latest treatments and ways of providing care. Dental and oral health practice changes and develops alongside research and technology, continually getting better. This means that practitioners need to have access to the latest research and technological developments in the field. For this reason, professional associations publish research in discipline specific journals and newsletters for their members and also run lectures and events such as conferences and seminars for their members to keep them up to date.

A further function of professional associations is to look out for the interests of their members and the community around oral health. When governments make decisions about how dental care should be provided, what sorts of services should be funded, what standards of education should apply and the laws governing practice, the oral health professions need to be involved. The professions have expert knowledge in the area of dentistry and oral health and governments call on this knowledge to help them make good decisions and laws. Professional associations look out for the interests of their members, provide advice on employment and occupational health and on legal matters and other issues for members such as practice management and insurance issues.

So, while a professional association exists to support its members, it is important that it reflects the knowledge and practice of the profession. For this reason, there are

many oral health practitioners working in professional associations as and alongside paid staff administrators and managers. Funding for professional associations come from the fees their members pay to join. Because it is the members that support professional associations, they are managed by Boards of management who are elected by members in a democratic or representative fashion. Association Boards of management (or Councils) usually have a president, secretary, treasurer and general councillors to lead the work of the association and be the "face" of the profession. They will often also have subcommittees to do specific pieces of work of value to the association.

It is not unusual that national associations (e.g. British Dental Association (https://www.bda.org), American Association Public Health Dentistry (http://www.aaphd.org/membership), Australian Dental and Oral Health Therapists Association (www.adohta.net.au), the American Dental Education Association (http://www.adea.org)) exert regional and international leadership and are part of larger international organisations. Some examples of dental and oral health professional associations are the International Federation of Dental Hygiene (www.ifdh.org), Federation Dentaire International (http://www.fdiworlddental.org) and the International Association of Dental Research (https://www.iadr.org).

9.2.1 Educational Requirements: Skills, Personal Attributes, Personality Traits

Generally speaking, there are not usually specific qualifications required for these role—just an interest in the profession and a willingness and motivation to serve. Usually, these roles are voluntary and many people learn on the job, taking on junior roles at the beginning until they gain experience. Individuals need to have some experience working in the oral health professions before they can run for office as these elections require that the office bearers of an association are respected members who will represent the members well. They also need to have some leadership skills (or an interest in them), an ability to look forward to see what is needed in the future and knowledge of the dental environment to understand how to ensure the association meets the needs of its members.

Good teamwork and collaborative skills are also important to be able to work as a member of the board, along with good communication skills. Board members are often required to speak up or advocate for the profession in the community, with politicians and with the media. Board members must also be able to communicate in written form as there are often policy papers to write for the profession and for the public, submissions to community, government and educational organisations, consultations and inquiries. Professional associations also often have their own websites and get involved in oral health promotion and the provision of expert advice on oral health to other health and community organisations and for the public.

Professional associations are great places to learn skills because they are often organisations with many volunteer workers. Presidents learn how to lead others, run meetings, chair committees and act as ambassadors for their profession and manage

change. Secretaries learn about developing agendas, taking minutes of meetings, managing communications such as writing submissions and responding to letters, managing social and other media communications and working with the paid staff and members. Treasurers learn about managing finances, promoting memberships and considering income sources. Other councillors will learn about organising and running conferences and journals, dealing with the media, considering the needs of members and how to meet them, developing codes of ethics and contributing to educational standards, working with universities, legislation and accreditation processes. In short, shaping the profession, representing it, contributing to its development and keeping it relevant to the needs of the community.

Many people who work in professional associations find they learn a great deal from the roles and make many new friends and develop their networks within and outside the profession. A retiring member of a professional association recently said . . ..

> I feel truly grateful and humbled to have been able to work with this association and hold office. It was an honour to be allowed to represent the profession at such a high level and for so long. I learnt so much and made so many lifelong friends. I had the support of fantastic mentors, innovators and influencers. No-one can make meaningful changes alone. The Association team are knowledgeable, proactive, understanding, committed, multitalented, caring, dedicated people who are not afraid to roll up their sleeves to achieve their goals. I am so proud to have known and worked closely with so many wonderful people (Past President, Oral Health Professional Association).

A career in a professional association, either as a part of a professional's academic development and service or as a career path within an association like an executive director for example, offers a challenging diversity of work, strong support arrangements and a great sense of community.

It will require additional time, and work will often be challenging and demanding, but a role in such an organisation can add depth and enormous experience to an oral health practitioner's skills set and career development opportunities. People often say that they gained much more than they gave, from the experience.

9.3 International Oral Health Organisations

In broad terms, any health professional can make a career at World Health Organization (WHO) as an international advisor—that means, working at a country different to his/her,—or, as a national officer—working at his/her home country.

From another perspective, an oral health professional can contribute to improvements in health by providing specialised knowledge on this subject, for example, oral health advisor at the oral health programme, or can contribute to improve health by providing specialised public health knowledge, e.g. advisor in epidemiology, human resources, health economics, etc., or act in a managerial capacity, e.g. representative at a country office, project manager, etc.

In any case, a WHO officer works within the framework of the organisation's mandate as the directing and coordinating authority on international health within the United Nations' system, which is to:

- Provide leadership on matters critical to health and engaging in partnerships where joint action is needed
- Shape the research agenda and stimulating the generation, translation and dissemination of valuable knowledge
- Set norms and standards and promoting and monitoring their implementation
- Articulate ethical and evidence-based policy options
- Provide technical support, catalysing change and building sustainable institutional capacity
- Monitor the health situation and assessing health trends (World Health Organization 2017a)

Within this framework, the officer works alongside the country leaders in order to understand and provide positive influence over the determinants of health and disease. When applied to oral health, this could mean providing the national authorities with the tools and technical assistance needed to design and implement a national oral health survey—measuring the amount and distribution of disease and its causes—and to assist the development of a national plan to improve the oral health situation observed. For instance, oral health professionals working at the oral health regional programme of Pan-American Health Organization (PAHO) have assisted several countries with the implementation of their national oral health surveys and setting up national fluoridation programmes (e.g. salt fluoridation) to reduce dental caries.

Although the oral health programme at PAHO has only one posting assigned, this work is possible thanks to the collaboration of a network of individual experts and institutions from throughout the region that contribute with expertise and time. Further information on the PAHO's oral health programme can be found in the programme's web page (Pan-American Health Organization 2013a).

WHO has six regional offices, and each regional office within the WHO holds specific health goals, and will make particular organisational arrangements according to them. For example, the regional Strategic Plan for the Americas set the following nine priorities for the 2014–2019 period (Pan-American Health Organization 2013b):

I. Improve health and well-being with equity
II. Ensure that newborns and children under 1 year start life in a healthy way
III. Ensure safe motherhood
IV. Reduce mortality due to the low quality of health care
V. Improve the health of the adult population with emphasis on noncommunicable diseases and risk factors
VI. Reduce mortality from communicable diseases

VII. Contain premature mortality due to violence and trauma addressing the main risks for adolescents and young adults
VIII. Eliminate priority communicable diseases in the region
IX. Prevent death, disease and disability resulting from emerging situations (Pan-American Health Organization 2013)

These health priorities have been formulated on the basis of the health situation analysis and its determinants, using a set of principles and core values—sustainable development and equity, the country member aspirations and articulation with the WHO global health agenda and the Sustainable Development Goals (SDG) (Pan-American Health Organization 2013b; Mariño and Singh 2016).

Implementation of this agenda relies on the multidisciplinary response of public health professionals, be it medical doctors, dentists, nurses, midwives, scientists, epidemiologists and also people with expertise in administration and finance, information systems, economics, health statistics as well as emergency preparedness and response (World Health Organization 2017b).

9.3.1 Educational Requirements: Skills, Personal Attributes, Personality Traits

In general terms, an oral health professional, like any other health professional working at an international organisation like WHO/PAHO, has to have a demonstrated background in public health or related disciplines, hold a sound body of technical knowledge and skills based on evidence on a particular health subject and be competent in the provision of technical cooperation in an international environment.

Therefore, besides being a health professional, it is essential to hold a Masters' degree in Public Health or equivalent. Being a public health professional will give you the skills to have a better understanding of the underlying causes of health and disease, the health system and offer evidence-based solutions, from a local, national and international perspective. It will also give you the skills to translate scientific knowledge into sound public policy.

Public health work involves encouraging collaboration amongst individuals, institutions and countries, for which you will need the arts of networking, negotiation and capacity building, amongst others. It also involves working with, and for people from multiple countries, religions, races, ages, sexual orientation, levels of responsibility, etc. and in different settings and environments; therefore, it is essential to be conscious of diversity and be able to work in multi-cultural settings.

Moreover, an international officer will have to be willing to live abroad. Therefore, it may become handy at this point to know that the WHO has 194 country members and six regional offices. In the Americas, PAHO has 27 country offices and three specialised centres. PAHO headquarters is located in Washington DC. Therefore, an officer could be posted either at Washington DC Headquarters, a country office or a specialised centre.

As mentioned before, oral health programmes usually have only one posting assigned, and although there are a multidisciplinary team of experts, consultants and advisors who you can discuss specific issues, when needed, it will require decision-making skills and the ability to work across disciplines, both health and non-health settings.

The office also requires that you show an acceptable competence in at least two of the official languages at the organisation (such as Arabic, Chinese, English, French, Russian and Spanish). However, regional offices may have different requirements. For example, at PAHO, accepted languages are: Spanish, English, French or Portuguese.

9.3.2 How to Join

If you are interested in exploring the health international arena, or expanding your understanding of international health, you could join the organisation as a volunteer or as an intern. The WHO advertises internship opportunities and a junior professional programme on its web page. In the Americas, you could find volunteer opportunities at PAHOs web page (http://www.paho.org/hq/index.php?option=com_content&view=article&id=1489&Itemid=4245&lang=en).

If you are already a public health specialist in the Americas region and want to deepen your understanding on the issues of international health, you could join the Programa de Formación en Salud Internacional (PFSI) for a 9-month period (For more information, please visit: http://www.paho.org/hq/index.php?option=com_content&view=category&layout=blog&id=1939&Itemid=3499&lang=en).

If you are already a specialist, these organisations can employ you for short periods of time as a consultant or you could apply for a more permanent position. For example, Job vacancies are advertised at WHO and PAHO institutional web page. See WHOs and PAHOs vacancies at http://www.who.int/employment/vacancies/en/ and http://www.paho.org/hq/index.php?option=com_content&view=article&id=1357&Itemid=1213&lang=en, respectively.

9.3.3 Advantages and Disadvantages of Working in International Organisations

To assist a country or countries in the search of better health policies and system requires a great degree of effort and responsibility. However, in professional terms, it is compensated by the fact that the impacts of such efforts have the potential to reach not only individuals or communities but also the international society as a whole.

International organisations also have a role in the promotion of countries' well-being, peace and understanding and in strengthening solidarity, which are also dimensions of health. To accomplish this, oral health professionals must have some specific technical expertise as well as the awareness, attitudes and dedication for the development and improvement of the human condition. It is also important to

work in organisations which provide the necessary tools, collaborations and mechanisms to allow for these skills to be realised, making oral health part of improving quality of life and contributing to the improvement of living conditions and health.

In personal terms, it is guaranteed that every day brings a different challenge and becomes an opportunity for learning and meeting new people and places.

9.4 Final Remarks

This chapter has presented some other nontraditional career paths for oral health professionals; careers in oral health organisations and professional bodies (e.g. professional associations, specialists' organisations, etc.) and in international organisations (e.g. World Health Organization, Med Sans Frontieres, etc.). From this perspective, the purpose of this chapter was to provide an overview of career paths in those fields and, in so doing, provide answers to the questions: why pursue a career in oral health professional associations/organisations?; how would an oral health professional working in such organisations would benefit the community?; and the type of skills, education and other experience needed.

Participating in the organised professions should be seen as part of the professionals' responsibility and advocacy roles. On the other hand, an oral health professional can provide specialised knowledge on this subject at an international level, for example, oral health advisor at an international oral health programme. The chapter includes authors from various countries and academic backgrounds and includes their insights gained from personal experience working in oral health professional associations or organisations as well as international organisations.

My Personal Journey (Ana Arana)

My personal search for an alternative career path in oral health started with a recurring question... Is there another way to contribute effectively to people's oral health?... This is how I started a search that took me to join the oral health programme as a volunteer at the World Health Organization (WHO) in Geneva soon after graduating. This experience helped me to understand the nature of Public Health from an International Perspective. It was key to decide becoming a specialist in Public Health at the University of London.

A few years later, I joined the training programme at the International Health of the Pan-American Health Organization (PFSI). In this training programme, young public health professionals, of various fields of work from the Americas, are immersed for an 11-month period in the issues of international health and the practice of international cooperation.

Subsequently, I joined the Pan-American Organization (PAHO) as a National Consultant at the WHO/PAHO office in Peru, to conduct the implementation of the organisation's cooperative plan with the Andean Sub-Region and, later on, to conduct a health cooperation project aimed at improving the health and nutrition of mothers and children of vulnerable populations.

Joining an international organisation early on my career gave me the opportunity to look at health issues from a global perspective and to have an insight on the dynamics involved in the process of building international policy frameworks conducive to health. Once at the country office, it gave me the opportunity to become involved in the planning and implementation processes of such policies.

I have travelled to most of the country regions, to most of my home country and have developed a broad professional network of good friends for life.

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Career Paths in Oral Health Industry

10

Guy Goffin, Susan Cartwright, and Stephen Haynes

Abstract

The oral healthcare market was estimated to be worth US$39.1 billion in 2014, with this figure expected to continue growing. This industry focuses on the development, manufacturing and sales/marketing of oral healthcare products for at home use by consumers and the development, manufacturing and sales/marketing of dental materials, products, services and equipment for use in dental practices. There are growing opportunities for oral health professionals who want to make the transition into work in the oral healthcare industry. Roles that can be taken up by oral health professionals include research, training, product development, product management, sales and promotion. For example, an oral health professional can provide constructive insights into the needs of dental practitioners and therefore influence the final form of products developed for use in practices. A dental professional background can also be helpful in building sales strategies and tactical approaches for dental clinics. Those who work in larger oral healthcare corporations will develop new skills in leadership, team work, management and advocacy and may enjoy opportunities such as travel. While they may be considered special by former peers who remain in clinical oral health, many oral health professionals may be suited to work in the oral healthcare industry.

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10.1 Introduction

The majority of oral health profession graduates (e.g. dentists, oral hygienists and oral health therapists) end up working from the time of graduation to retirement in an oral healthcare practice, whether it be private or public. Here, they carry out advanced technical procedures to deliver "best in class" treatment to patients. Although this is extremely rewarding from a personal point of view and beneficial for the health and oral health of individual patients, there are other ways to positively influence the oral health of populations through different career paths. In this chapter, we will highlight some of the options that exist outside working in an oral health practice to leverage a dental education towards improving oral health for people all over the world. The chapter is structured in five parts covering (1) the different areas within the dental industry and the roles an oral health professional can take up in these areas, (2) why an oral health professional should pursue a career in the dental industry (3) how an industry-based oral health professional can make a difference for the community, (4) what background or education an oral health professional should have for being successful in the dental industry and (5) what positive and negative experiences an oral health professional can have when working in the dental industry.

This chapter has been prepared by a team of oral health professionals that have or had deep working involvement in the dental industry, but started with varied backgrounds and education. Two of the authors have clinical experience in private or public practices, one came from a sales and marketing background, but has built up his own knowledge and understanding of the professional arena through different roles in the dental industry. They all have, or had, leading roles in the dental industry and built experience and knowledge that made them successful in their respective positions (see personal notes later in this chapter).

10.2 The Dental Industry

The dental industry can be divided into two main areas: (1) the oral healthcare industry: development, manufacturing and sales/marketing of oral healthcare products for at home use by consumers and (2) the dental industry as such: development, manufacturing and sales/marketing of dental materials, products, services and equipment for use in practice. This group covers dental materials such as composites, but also includes implants, orthodontic appliances, dental equipment, continuing professional development and services such as dental insurance, practice management and regulatory compliance.

Globally, the oral healthcare market was estimated to be US$39.1 billion in 2014 and is expected to reach US$50.8 billion by 2020 (Future Market Insights 2014). Consumers look for oral care products that will enhance their oral health, but there is also a growing demand for a beautiful white smile and fresh breath. The oral care category, therefore, is likely to increase in value in the coming years, especially if product ingredients or innovative appliances continue to enhance the ability of

products to deliver what consumers are looking for. This puts a lot of focus on the research and development of new products. Dentifrices, toothbrushes (manual and electric), interdental cleaning devices and mouth rinses are the main drivers of this business. Several major (e.g. Colgate, P&G, GSK, J&J, Sunstar, Philips) and some minor and local players control this market globally. Although this market is well developed around the world, there are still huge opportunities for the expansion of markets in developing countries such as Africa and Asia.

The dental industry has evolved in recent times to become relatively compact. Major corporations, e.g. Dentsply Sirona, Danaher, 3M, GC and Ivoclar Vivadent, have acquired or developed expertise in many of these technologies as they seek to provide a complete dental basket to the profession.

The value of the global dental consumable products market was estimated at US$16.5 billion in 2015 (Transparency Market Research 2017) and dental equipment was estimated at US$6081 billion in 2013 (Grand View Research 2014). This market is likely to increase further, mainly because of the improved services in developed countries, an increased need for treatment by older people, a better understanding of the role oral health plays as an intrinsic part of the overall health of the individual and communities, the relative importance people give to a healthy smile and a growing need in developing markets.

Within each area, there are different roles that can be taken up by oral health professionals:

- Training: Conduct technical training programmes for end users including course preparation and developing support tools for attendees.
- Research: Undertake research with the objectives of validating, modifying, improving or creating new products or systems.
- Product Development: Manage and coordinate the product development process including market needs alignment, technical feasibility and design optimisation.
- Product Management: Develop and implement marketing programmes for designated products, monitoring all aspects of a product's lifecycle.
- Sales Promotion: Preparation of sales promotion plans and advertising.
- Sales: Liaise directly with end users to identify needs and provide solutions that help deliver better patient care and/or improve productivity and/or ensure regulatory compliance.
- Regulatory: Ensuring manufactured products are compliant with applicable regulations and appropriately produced and marketed.
- General Management: Planning, encouraging and directing activities of a group of workers as part of a strategic plan in alignment with the company's objectives.

The dental industry specifically seeks professionals with an in-depth knowledge of chemical or mechanical engineering. In this context, an oral health professional can provide constructive insights into the needs of dental practitioners and, therefore, influence the final form of the products available for use in practices. Additionally, a dental professional background can be helpful in building sales strategies to practices and tactical approaches for successful business results. Dental professionals are

ideally suited to training and education roles within the dental industry, especially when new instruments or materials are linked with new or modified clinical techniques. Finally, products used in dentistry need to deliver exemplary clinical results; therefore, testing in vitro and in vivo is key to the delivery of safe and effective products, to outperform competition and guarantee success in the market place. Dental professionals are best qualified to carry out this clinical testing in a practice setting or to deliver superiority claims for the respective products.

For oral healthcare products, oral health professionals may be included in basic research into ingredients that can make a difference to the oral health of consumers. Some of them may also be part of clinical teams researching the effects of specific chemical or mechanical properties of products on a single patient, groups of patients with a specific disorder or generally on whole population groups. Companies may also employ oral health professionals to help build the evidence needed for the endorsements of oral care products, recruiting those with knowledge of the dental world (local, regional, global). Some companies also organise regular visits to dental practices to increase the exposure of their products and encourage the active recommendation of products to patients. The latter is very important because patients are most open to new products when these are actively recommended by their treating oral health professional. Dental professionals can be positively influenced with communication that delivers a clinically relevant and evidence-based message. Dental professionals with experience in an academic world or clinical practice are well-placed to fine-tune the communication tools developed by marketers.

10.3 Why Pursue a Career in the Dental Industry?

There are only a small percentage of oral health professionals who work in non-clinical careers in such roles as administration, sales, research and marketing for dental supply, dental equipment or oral care product manufacturing companies. So why join such a company?

If you are interested in dental products or clinical testing, there could be a role for you in the research and development department of a major dental product or oral care company. If you prefer the challenges of business, management, education or oral health promotion, dental products and oral care companies may want to recruit you for specific positions in the sales, marketing or professional relations areas.

While working in a dentally related business is not a common choice for oral health graduates, it can be a rewarding experience and some dental professionals have made a significant difference to the ways in which companies reach out to practitioners and build partnerships with the profession and its associations. Some companies, for example, support the promotion of oral health through university and continuing professional development programmes to help enhance dental education.

If you take up a role with a company, it is likely that you will be regarded by your peer practitioners as “special”. Careers in the dental industry offer great opportunities

for developing "other" knowledge, expertise and experience that will help you reach different goals to those a dental practice can offer. This may include an understanding of the chemical or mechanical specifics of products, interaction with experts in specific areas of dentistry, working with bigger teams or even helping build a preventative approach in the dental practice world.

10.4 How Would an Oral Health Professional Benefit the Community with His/Her Involvement in the Dental Industry?

Dentistry has changed a lot over recent decades. The dental industry has played a tremendous role in this evolution. Without the industry's involvement, for example in the development of effective fluoride technology for dentifrices, such a massive reduction in caries prevalence could not have been achieved. Without the development of dental implants or laser therapies, patients could not be treated as effectively as is the case today. Also, the improvement of dental consumable products can help practitioners deliver superior quality treatment of patients, with less damage to soft or hard tissues in the oral cavity and with an improved life span of restorations. Having clinical experience and a product development perspective, oral health professionals can help companies to invent and develop new technologies, which can be translated into new products or improvements to existing products with the clinician's needs at the forefront.

Nowadays new products are being developed and promoted which recognise that there is no general health without oral health. A key role of oral health professionals in the dental industry is to ensure that oral health is not left out of the picture when general health initiatives are established, e.g. emphasising the common risk factors with relation to periodontal and heart disease, diabetes, obesity and dental caries. The development of new dentifrices that control the microbial balance in the oral cavity may contribute to better oral health and the reduction in caries and periodontal disease. This development may also change the metabonomics in the body and therefore positively impact on the overall health of consumers.

10.5 How Much Education and Other Background Does an Oral Health Professional Need to Have a Career in the Dental Industry?

If you are interested in products and how they are developed and brought to market, a manufacturing business could be a great place for you to work. There are many steps between the formation of an idea for a product and bringing that product to market.

- Identification of the problem. Research into what is missing or what the market needs are
- Research and development of possible product options
- Can it work? Lab testing of efficacy
- Does it work? Test of effectiveness in a clinical setting
- Does it serve the needs of the end- users? Consumer or professional research
- Does it reach those who it is supposed to reach? How can it be marketed?
- Should it be used, given other demands on a fixed budget? Economic evaluation

You may or may not be in charge of any part of this chain, but you need to have a sound command of research methods and approaches and their limitations, marketing, health economics, public relations and communication skills.

These include such things as being able to formulate or create an effective product; testing the product through the stages of in vitro research and then clinical trials; completing registration processes in various countries and organising production, packaging, distribution, pricing, marketing and sales. It is a complex process and there is a lot to learn if you have been based in general dental practice before taking on this challenge. In the Research and Development departments, a further degree or experience in chemical or mechanical engineering, or in clinical research or epidemiology, may be required by the hiring company.

As you climb the corporate ladder and take greater managerial responsibilities and duties, you will expand your area of knowledge and expertise from oral health into other areas. This will require you to constantly review and reflect on your capacity to challenge yourself and to move out of your previous professional comfort zone. This might be common to any professional path that you choose, including clinical, but within the dental industry a key difference is that you may have to work with people with varied backgrounds and expertise and may have to manage business economics quite different to those of a clinical practice.

Sometimes your experience as a dental practitioner may be enough to secure a role but for business focused roles, an MBA could be useful. If the role you are considering has an education or health focus, a postgraduate education or public health qualification may be necessary or desirable.

If you do take up a role in an oral healthcare company, your viewpoint on health care may change dramatically. No longer will you be engaged in the care of patients on a one-to-one basis to improve their oral health, you will now be looking to change things on a population level. Though this is also true for public health practitioners, in the industry it is slightly different because you will be asked to strive for a balance between healthcare and business results as the ultimate goal. Understanding oral health promotion is very useful so that you can implement strategies that will have an impact on large numbers of people. Such oral health promotion might include support for oral hygiene promotion programmes in schools, fluoride varnish

programmes introduced to remote communities who have no access to water fluoridation or large-scale oral health education projects. There are many opportunities to be involved in education: as the dental expert both internally with employees and externally with customers of the business; in the development of educational programmes for dental faculties and in schools and communities.

As in every role, your degree and educational background is only one part of the equation and your attitude and character will define how far you can go and if success will continue with you in your role.

10.6 Pros and Cons of a Career in the Dental Industry

If you like constant interaction with people, it is very likely you will enjoy a role in a company. In larger corporations, this type of role provides an opportunity to develop your leadership, team work, management and advocacy (for oral health) skills. You will most likely be required to work with a group of people who you will either be expected to manage or you will be part of the team. Effective communication skills are essential as well as the ability to work under pressure and meet deadlines.

As an oral health professional, you have a key role in engaging with your colleagues for the right balance between health and economic interests. You will be instrumental in achieving higher standards of health in the population, thanks to the company's work.

However, it is likely that relationships with your peers will change. This is potentially the most difficult part of a move to a business role. While it is true that an objective of the dental industry, like any industry, is economic growth and sustainability, some dental professionals have an in-built distrust of business people and may regard you with caution and reserve. It should be remembered that businesses are interested in sustainability and this not only applies to processes and ingredients used in the manufacturing of products but also to fostering the health of employees and communities. Most companies operate with a "Code of Ethics" which guides employees to follow correct procedures and maintain a high standard of behaviour and accountability.

As a manager, you would require analytical and strategic planning skills, including the ability to develop and track key performance indicators and the identification of annual priorities. You would also be required to communicate your team's perspective to the company through business plans and review processes.

In a managerial position, it is likely there would be a lot of travel involved, especially if the business is a large multinational. Those with a dental background have a different skill set to most employees and so may need to travel frequently to make presentations or carry out training.

This type of job is attractive to those who like looking at the bigger picture, working closely with a large team of people and the challenge of doing something different, but still using a dental background to have an impact on global oral health.

10.7 Conclusion

If you think you may like the challenge of a different type of career in dentistry and have the passion, willingness and flexibility to learn and adapt to the innovative world of dental care, and to influence oral health outcomes from a different perspective, there could be a role for you as an oral health professional in the dental industry. The roles may be found within the development and research of new technologies in dental materials, products or oral care products for at home use as well as in marketing and sales to professionals or consumers at large.

An understanding of modern dentistry, market trends and how practitioners think and work is the basis for any role in the dental industry. However, you would require extra experience and knowledge to be successful in whatever role you may pursue. Knowledge and skills beyond the traditional (e.g. sales and marketing understanding) may perhaps be acquired while carrying out a role, but formal training on product technologies is key for turning technical information into marketing tools that influence practitioners' acceptance or recommendations. Companies are well equipped to provide you with this training at the start of your career, but ongoing learning on new developments is essential to stay updated and enable you to provide the company with the essential "dental" input to enhance the success of the business. Managerial, leadership and communication skills are prerequisites to becoming a leader in your field within a company and this will allow you to build a long-term career. It is a continuous journey in learning, but the more you do the more you will improve.

Through a career in the dental industry, you may be engaged in oral health promotion on a population level, rather than working on a one-to-one basis to improve oral health, as is the case in a dental practice. Through the development and marketing of new and innovative products that deliver better care or better oral hygiene at home, you may be pivotal to the success of a product and therefore the potential improvement of the oral health of all people. As an oral health professional, you may assist in the acceptance of new and better products by dental professionals and drive their use through recommendations.

Though you may be regarded as "special" by your colleagues, careers in the dental industry offer great opportunities to learn more, to experience different worlds and to become an expert in today's world of dental care. As in every role in a professional life, it is all about rising to the challenges and turning these into a chance to enrich yourself, to help the community and to enjoy your professional life to the fullest.

10.8 A Collection of Personal Journeys

10.8.1 Stephen Haynes

In 1986, I joined the dental industry in New Zealand, with no previous dental background or experience. I was very fortunate to be mentored and guided by an exceptional manager who was keen to share her clinical experience and knowledge

with a willing and enthusiastic student. From this positive experience, my passion for dentistry and its associated technologies was ignited and in 1994 I joined GC Asia, based in Sydney. I was appointed Managing Director GC Australasia in 2009 and in 2015 moved to a regional position as Head of Product Management for GC Asia.

In these roles, I have worked closely with many colleagues who have qualified as dental professionals and have chosen to pursue a career in the dental industry. To offer some insight as to why a clinician might join the dental industry, I have selected, in anonymity, three of their journeys to share. Their paths highlight the opportunities the dental industry offers to caring professionals with a strong desire to "make a difference" who also harbour passions for business, training, research or education. Beyond practicing dentistry, each of my colleagues had recognised activities within a work environment that would lead to higher levels of job satisfaction and a strong sense of personal achievement. Adapting and developing their skills to suit those required for a position within the dental industry has allowed them to follow a less traditional but more personally rewarding career path within the dental profession.

> As a young child, I was drawn to and curious about the business aspect of things. While studying in dental school I was always involved in extra-curricular activities and had found these activities to be very dynamic and exciting. There was always something new and the fulfilment felt when the events and programs were successful is what eventually pushed me to explore a career outside of dental practice. I had practiced as a dentist in different fields (oral surgery, orthodontics, periodontics, general practice) hoping to see what specialty would suit me best but I didn't quite find my niche. Being in the dental industry has allowed me to merge what I love to do and what I was trained to do. It allows me to be updated on the latest technology and yet still feel connected to what I had initially studied.

> It was an opportunity offered to me. At that time my job (as a public health dentist) was not challenging enough, the pace of work not fast enough and nothing much could change because of bureaucratic limitations. Working in the dental industry enabled me to get firsthand information and experience with the latest technology and it facilitated my passion for oral health prevention. So I am fortunate that in my work I can do research, continuous learning, and working at the same time. By sharing the latest research, information and technology advancements with dentists I can help the profession to serve the community better.

> To be honest, I did not want to be a dentist in the beginning. It was a decision made by my parents following the trend in the family (I am the 12th dentist in the "clan"). But my attitude has always been if you do anything, do it well and so I was able to complete the degree. I initially wanted to become a journalist/newscaster or someone who works in the corporate world. I have a passion for speaking in public and teaching but at the same time, what else can a dentist do aside from treating teeth and doing clinical practice? I had to accept it. In my final year, I heard about the dental manufacturing industry where dentists can be employed to do training, product management and the like, but at that time I didn't have the opportunity to pursue this dream and so I continued practicing and gaining experience clinically. I became an associate dentist in one of the biggest practices in town and once I had gained enough knowledge and experience I was able to set up my own practice. But, when the opportunity came to be a part of a dental company, I grabbed the chance to pursue what I really wanted to do. Now, as a product manager and trainer, the clinical experience that I

have gained through the years has helped me relate very well to the audience of dental healthcare professionals. I quickly learned that the ability to be a fast learner plus a hard worker are essential traits one should have in order to succeed in the role. It is also important to have the confidence and personality to be able to engage with your peers. The role entails a continuous journey in learning and at the same time provides challenges that help you become better as you do more.

10.8.2 Susan Cartwright

I never thought I would be a dentist when I was growing up. I fell into and really enjoyed the course. I graduated from Otago University Dental School in 1983 with a BDS and completed a Diploma in Clinical Dentistry in Periodontology with Distinction in 1998. I worked in private dental practice in Hamilton, London and Auckland while raising three sons. This was a busy time but I found working in a dental practice to be a good choice when juggling motherhood and career. Being able to work to appointments allowed me to attend important events in my sons' young lives. However, I always felt that there must be more to the job. The isolation of working in a surgery all day with limited interaction with people was hard for me.

In 2000, a new oral health degree course was started at AUT University. This was a great opportunity and I joined this programme during the establishment phase and assisted with the development of the curriculum, accreditation, staff recruitment, teaching and creating appropriate clinical facilities. This was an immense project which sapped my energy but also provided me with a real sense of achievement. Nothing compares to seeing students graduate into a new career that will set them up for life.

While at AUT, I completed a Master's Degree in Education with first class Honours alongside my role as the Head of the Oral Health Department and I gained further valuable experience as an examiner for the New Zealand National Oral Health Survey, 2009. This was a very interesting phase of life for me. I was struck by the fact that the practice of dentistry in the wider sense could involve many varied challenges beyond the surgery/clinic. This allowed me to think more broadly and to recognise the value of further education. I had wrongly assumed that my fear of public speaking would discount me from being able to undertake a career that involved talking to groups of people on a daily basis. Overcoming these fears has led me to some exciting career changes.

I would urge you to value further education, to think broadly and not to let your fears limit your choices in life! Persevere with what you believe in and don't be afraid to reinvent yourself.

I am passionate about the prevention of dental disease and the promotion of oral health and have provided dental aid in New Zealand to isolated communities in Northland and Balinese kiwifruit pickers in the Bay of Plenty. I have also visited Cambodia and provided care for orphans and prisoners.

In September 2010, looking for a new challenge and adventure, my husband and I moved to Sydney where I took up the role of Scientific Affairs Manager for Colgate Oral Care in the South Pacific region. I have been able to follow my interest in the

prevention of oral disease and to work with various communities and professionals to establish programmes that will benefit oral health. Recently, I had the opportunity to spend 2 months at the Colgate Research and Development Centre in New Jersey. This was a fascinating experience in the science of product development and clinical research. I only wish I had known more about this world earlier in my life as I think I would have followed a different path and not spent 25 years in clinical practice before making a move!

I continue to enjoy my role in a global business and hope to be able to continue to contribute to improvement in oral health in the communities I am involved with. I wish you well with your journey. The dental profession certainly has a lot to offer as a career choice.

10.8.3 Guy Goffin

Throughout my professional life, begun in 1975 in Belgium, I have had the opportunity of experiencing several career paths. This enables me to now look back at an extremely enriching and exciting professional life.

After graduation, I immediately started my own practice and I quickly became focused on preventive care. This was in the late seventies, only 15–20 years after the "invention" of Fluoride in dentifrices as a caries-preventive tool. However, disappointed by the potential for a single dental practice's preventive approach to impact on a population level, I joined the Belgian working group on oral prevention. Driven by a recognition of the need for prevention, the regional dental association effectively supported the working group and as the group's president, I also became a board member of the association. We tried hard to change oral health behaviour in children, but had no clue of the effectiveness of the programmes we developed and brought into schools. I, therefore, looked abroad to learn about epidemiology and to bring it to life in my home country with the help of the dental schools. I had to learn about working in an academic environment, searching for budgets, building and calibrating a team of dental professionals and finally analysing the results with statistical measures. From practising in a practice, leading in a dental association and building a working group, I thus also became involved in the academic world.

Through my search for sponsorship for the research, I came into contact with dental professionals and others working at big oral care companies. I quickly understood that their world was different from the one that I had been in over the past 15 years and that I had to change my approach from purely requesting sponsoring budgets towards building partnerships that could fulfil the needs of both sides. After I had made that change in mindset, the management of Procter & Gamble in Brussels saw that I could help them build this type of win–win partnership. I started first as a consultant in 1990 and then as an employee in the company's oral care business. From 1998, I led the professional marketing and relations department for Western Europe, later expanding the role to include the newly opened markets in Eastern Europe. Thanks to the integration by Procter & Gamble of Gillette's Oral Care business, in 2005, I began to focus on the professional and

scientific relations part of the professional business, leaving the marketing and sales to other better qualified managers. This allowed me to build a team of qualified professional and scientific managers in most EMEA countries (Europe, Middle East and Africa) and set the vision, strategies and tactics for achieving the endorsement of key opinion leaders in dentistry, dental schools and among dental professionals at large. Most of these newly recruited managers had dental backgrounds as practitioner, newly graduated dentists or other dental professionals, with degrees in hygiene, periodontology or even maxillo-facial surgery. I proudly left the business and left the leadership to my successors when I retired from Procter & Gamble in 2014. I am still involved in the preventive aspect of dentistry, giving presentations around the world at congresses and I provide support to associations that care about the oral health of people around the world. For the latter, my extensive network in dentistry and broad experience in practice, association, academic and industry is extremely helpful.

As with all jobs, I have experienced difficult times and more easy going moments that I surely remember best. The first days, weeks and months in the company were a time of constant learning. The support of the company leaders was extremely important for overcoming these initial hurdles, but also later in my career it was vital to have the confidence and support of my immediate managers to ensure broader acceptance of my role. It was important to quickly learn to speak the same language as the others, to turn actions that I thought were important for oral health into economic benefits for the company and to show off successes, building credibility and acceptance of the role of professional endorsement in the overall marketing plans. Strict budget planning and follow-up, plus full integration of the professional plans in the overall marketing strategy, was key for successfully executing long-term programmes. There have been ups and downs, but overall I do feel proud to have achieved, through these different roles, a difference in oral health and general health with populations across the EMEA region.

I sincerely hope that I can go on for a long time, working on the promotion of oral health and thus helping to build a world without oral care problems for all.

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Part IV

Academic Career Path in Oral Health

Research in Oral Health: A Career Path

11

Rodrigo J. Mariño and Victor Minichiello

Abstract

This chapter provides a context to understand the role of research in oral health. It describes the relevance of research in advancing knowledge and practice in dentistry and oral health and then outlines the different research career pathways available for oral health practitioners to pursue. Practical advice is also provided for people who want to pursue a research career, including the personal journey of the research career of a practitioner and how he progressed from being a clinician to seeking postgraduate higher education training in research.

11.1 Introduction

Any health care system depends on knowledge about health and disease, and the application of this knowledge, through various technologies, in order to improve the health status of the community. Research is also fundamental to building a profession's knowledge base.

The purpose of research is to establish facts and reach new conclusions which will inform action. Research in oral health is defined as research conducted by oral health professionals, or the type of research oriented to matters of importance to oral health professionals, or both (Axford et al. 2004). A career in academic research can span several areas, including basic research, clinical research, translational research and public health research. While none of these is different from health research, oral health research is needed to address and advance the issues that are specific to our

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profession, i.e. those aspects that are unique to dentistry. However, we must not forget that they are also part of a whole.

Research activities are usually done in universities, where most research workers are concentrated, with paralleled activities in teaching. This is particularly the case with dentistry, due to the fact that most dental research is conducted within university settings, whilst the majority of dental care is provided by dental professionals in the community (Clarkson 2005). However, as is described in Chap. 7, research is also conducted in governmental institutes (e.g. National Institutes of Health in the United States) or by industry partners. Funding for research may come from varied sources; apart from government funded research conducted mainly by universities, private companies and foundations also give grants to universities for health research.

Research provides the knowledge and standards on which to base health policies. Research has been very important in shaping our professional practice and care for patients; it also provides the rational for decisions and actions. Furthermore, it provides opportunities to attain better health outcomes; to extend and improve people's quality of life and eliminate oral health disparities. Research also includes applied research, for example, research to examine the attitudes of practitioners or patients towards oral health care as well as studies that examine the effectiveness of training, the physical layout of dental clinics, etc.

This chapter explores training paths and opportunities to develop research skills and credentials to prepare oral health professionals for the challenges likely to be encountered in this career path. It provides an overview of the role of research in general dental practice and discusses the different research paradigms and how they apply to oral health. The second part of the chapter describes how oral health professionals can benefit from research, even if a professional does not pursue a career in research, and how to address the disconnection between research outcomes and the realities of patient care in dental practices. Finally, the chapter provides the personal career pathways of the authors to highlight the diversity of their experiences in establishing academic research careers.

11.2 The Relevance of Research

In biomedical research, quantitative research approaches are most often used to understand the facts of our biological system and what the effects of clinical interventions are on the body. Randomised clinical trials, systematic reviews and measurement studies are at the top of the hierarchy of reliable evidence. However, over the past few decades, there has been a growing appreciation by both academics and clinicians of the importance of understanding the patients' perspective, how they give meaning to their health conditions and how their interpretations, attitudes and preferences towards their self-health care can influence quality of life and health care.

With the growing awareness of the importance of the psychosocial impact of the disease and wellness process on patients, researchers are turning to qualitative

methods. This approach, as Alhamdani (2015) argues, gives dental health providers better understanding of how patients perceive particular oral health issues and how this knowledge can improve oral health outcomes. Increasingly, we are seeing the publication of qualitative studies in oral health literature and greater sensitivity by practitioners to the importance of the social and cultural character of oral health.

Many oral health students/clinicians have the opportunity to undertake some form of research as part of their undergraduate training. They may have established an area of interest and pursued research projects to develop, refine and expand the body of knowledge that shapes and enhances the practice of oral health, such as:

- Oral health promotion, disease prevention and oral health conditions
- The social, biological, economic, physiological, environmental and behavioural aspects that have an effect on diseases and oral health conditions
- The determinants, causes, diagnoses and distribution of diseases and oral health conditions
- The processes of growth and development
- Clinical oral health practice
- Vocational education and workforce issues
- The administrative aspects of oral health services and many other professional issues

The American Dental Association (ADA) in its most recent report on "Research of importance to the practicing dentist, 2017–2018" (American Dental Association 2017) states that "it is imperative that the ADA takes a leading role in promoting, conducting and critically reviewing research on topics related to dentistry and its relationship to the overall health of the individual". The report identifies four key topics of priority in dentistry that are well represented in oral health journals across the globe.

ADA also put forward an agenda for practitioners and researchers in the field to collaborate on research that:

1. Strengthens the nation's investment in the oral health research infrastructure and increases the number and scope of oral health research collaborations across the health sciences at all research institutions, including federal agencies, academic institutions, industry and private non-profit organisations.
2. Secures long-term support for basic, clinical and translational research addressing caries, periodontal disease and oral cancer.
3. Secures support for long-term longitudinal studies aimed at improving the diagnosis, prevention and treatment of oral diseases and conditions.
4. Supports and advances translational research designed to identify and overcome barriers to the adoption and delivery of known, effective preventive and therapeutic interventions.

The expansion of scientific research has led to an unparalleled development in sophistication, scope and potential. In the last 50 years, major advances include the

recognition that (oral) health education by itself is not sufficient to change behaviours, unless combined with motivation, skills, opportunities and a social environment to support healthy lifestyle (World Health Organization 1986); diseases has been eradicated or controlled; the recognition of water fluoridation as one of the ten most successful public health measures from the twentieth century (Centers for Disease Control and Prevention 1999) and the identification of the common risk factors approach to address many chronic conditions, including oral health conditions, to name a few. In the clinical domain, the last 50 years has seen the emergence of dental implants; digital X-rays; 3D imaging and printing and, of course, the massive dissemination of information and communication technologies in health as well as in our lives. This development will only accelerate in the future, given the explosion in science in areas such as biotechnology, molecular biology, diagnostic systems, immunology, robotics, more effective technologies for behavioural change and health promotion campaigns at the individual, community or national level. Nonetheless, research and technologies represent both an opportunity and a challenge, as the introduction of new technology in oral health practice also means additional training and increased expectations from the public.

One of the key challenges is to continue acquiring new knowledge, correcting previous knowledge and integrating it with new facts and conclusions, which is what research is about. This is because human knowledge is imperfect, temporal and subject to revision by new evidence, rephrasing Glanz observation: "Blind faith and the unquestioning belief that we are 'doing good' are weak substitutes for sound evidence" (Glanz 1996). Additionally, research, new discoveries and technology are part of our cultures and our professional responsibility. In fact, science and technology are the foundations of the social and economic development of any country. However, in many countries, there is an acknowledged shortage in the recruitment of faculty to dental schools and oral health graduates taking up research careers (U.S. Department of Health and Human Services 2003).

A shortage of scientific researchers produces negative effects for society. Multiple strategies are needed to attract oral health professionals to careers in oral health research and to ensure sufficient numbers of researchers to meet present and future needs. The barriers for the training of researchers in oral health can be grouped into four main areas: (a) Human resources, (b) Financial, (c) Cultural and (d) Bureaucracy.

Human resources (training and retention):

- Oral health research workforce capacity should be enhanced. Strategies should address ways to permit optimal flexibility in employment of the oral health workforce to maximise research effectiveness.
- Lack of an academic research career and, more importantly, lack of certainty of employment; the overly competitive race for grants, fellowships and jobs (Metcalfe 2013). Clear academic research pathways will provide sustainability for academics conducting research in oral health.
- Training in careers with strong scientific and technological components, such as oral health professions, is often conducted by lecturers who do not conduct

research. This "teaching" university is particularly serious in the private system of tertiary education.
- Lack of flexibility to allow oral health academics to achieve both clinical and research goals as part of their planned career development process.

Financial:

- Lack of research infrastructure. The quality of the resulting human resource is dependent on the quality of the researchers within the university and the available infrastructure of the institution.
- Lack of incentives for research. Although rewards in research and the rewards in clinical practice are different, financial incentives in academic research and practice of the profession can never be equivalent to private practice.
- The financial resources that academics require for their research are, in general, on a competitive basis (i.e. grants), and their allocation and/or renewal is associated with the quality of the past outputs.

Cultural:

- Clinical practice oriented to the training of professionals for the treatment of patients as independent practitioners, making oral health research and clinical practice two separate cultures (Owen 1995).
- Academics with training as clinical specialists tend to provide mentorship and role modelling as clinicians. That model should be expanded to research academic career paths.
- Existing programmes in health research do not target specific aspects of oral health research.

Bureaucracy:

- Universities are generally bureaucratic organisations. Sometimes, the onerous burden of teaching and administration, in particular for more senior academics (Metcalfe 2013), can limit opportunities in research and to develop research and publication track.

11.3 How to Develop a Research Workforce in Oral Health: Research Pathways

There are several opportunities for people who want to pursue a research career (American Student Dental Association 2016). They can work in a dental or oral health school within a university, in a dental research institute, a government agency or within the private sector. Most oral health research takes place in standard biomedical laboratories and clinical research environments. Oral health research could also be located within social science and public health academic environments

that also focus on understanding how people give meaning and interpret oral health within a larger social and cultural context and health care system.

Among oral health clinicians, there is a sense that research is very important (Hyde 2007). Nonetheless, the skills required for research are not the same as those for clinical practice. Thus, in line with the World Health Organization's initiative to strengthen and develop research capabilities (World Health Organization 2004), there is a need to develop and implement courses in research methods for clinical and public health research. As an oral health practitioner, you acquire the skills to become a researcher and be involved in research. These training activities may include continuing professional development (CPD) using traditional face-to-face teaching methods, as well as the development of computer-aided learning, interactive learning, e-learning, virtual learning and online courses for oral health professionals interested in research, in particular for those living in non-metropolitan area. Alternatively, oral health practitioners can get involved on more hands-on endeavours by joining a practice-based research network (PBRN) (Mariño 2015).

Whether you are preparing yourself for a career in research, or you are an oral health practitioner who will do a bit of research as part of your professional practice as a clinician, you need to prepare yourself and have some training. That is, you need to understand that doing research is a process which requires new skills, knowledge and attitudes, which will be used in a unique manner. The research process consists of a series of phases and steps that allow the researcher to move from formulating a question to finding an answer (Borbasi et al. 2003). That is, there are sequential steps or phases to be performed with research. If any of these steps is not made properly (weakened), all of the research is at risk.

Research does not begin with questionnaires, data analysis, statistics, etc. Every research inquiry starts with a question that seeks an answer and directs the study. However, there is a difference between research questions and those that we ask daily and naturally in our life or even in our professional practice. A research question should be concise, clear and measurable. Of course, a research subject may lead to many research questions whose selection is made according to what is known about the subject, feasibility, resources, expertise, interests we have, and so on. Claude Levi-Strauss once said: "The scientist is not a person who gives the right answers, he's one who asks the right questions".

The word research often suggests a long, tedious and expensive process requiring laboratories, microscopes and experts. The truth is that research in itself is an activity that can occur naturally in each professional practice. Thus, for interested oral health practitioners PBRN allows practicing health care providers, both to engage with investigators experienced in clinical, health services and public health research, for the purpose of increasing the production and translation of research, while at the same time enhancing the research skills of the network members (Mariño 2015). This is important as a review of research in dentistry reported that, of the research reviewed, only 2% related to primary dental care (Clarkson 2005). Furthermore, the quality of studies undertaken in primary care settings was questioned (Crawford 2005). This highlights the need to involve general dentists in research. However, improvements are not likely to occur without training, guidance and support for

those dentists to foster improved design and quality of research undertaken in primary care settings.

With the culture of evidence-based knowledge informing clinical decisions clearly established in clinical education, and the fast and assessable access to research information on the web via the broadband, the importance of research to clinicians and curriculum development has been engrained in the minds of all medical and health graduates. Within this context, a PBRN will facilitate the implementation and translation of new oral health research, into evidence-based daily practice of dentists.

11.4 Continuing Professional Development

These days it is not possible to expect or believe that the training received as undergraduate students will sustain forever. Continuing professional development (CPD) is essential to oral health professionals to remain current in skills, knowledge and theory. There is no justification for an oral health professional who, once graduated, does not maintain links with the dental school where he/she graduated or with oral health professional organisations. Not doing so, may become a negative factor for professional advancement, as he/she risks becoming outdated concerning the technical aspects of the profession, as well as a breach of legal obligations. Changes in scientific knowledge basically occur on a daily basis. This is something that oral health professionals cannot ignore. For this reason, in some countries, the National Law requires practitioners to undertake CPD to improve and broaden their knowledge, expertise and competence, and professional qualities required throughout their professional lives (Australian Health Practitioner Regulation Authority 2015).

Furthermore, these days clinical decisions are easily verifiable and there is high public expectation that clinicians make decisions based on the latest and best research results. Informed consumers are seeking evidence-based clinical practice. An evidence-based practice is defined as: the interception of best research evidence with clinical expertise and patient value" (Sackett et al. 2001).

It is important to note, however, as Kishore et al. (2014) state, that in dentistry the evidence-based movement is at a relatively early stage of development, although recent graduates see evidence-based dentistry as an important tool to increase best possible care for their patients. The focus is to ensure that oral health professionals are competent to read clinical research and have the methodological expertise to critically appraise and use this knowledge to inform their practice and clinical decisions. Increasingly, we see problem-based learning models being used that integrates evidence-based clinical practice guidelines (EB-CPGs) in dentistry clinical placement.

11.5 A Career in Research and Research Training

Generally, courses and opportunities in research are intended for oral health professionals with no prior research background or experience. However, although there are several pathways, an academic is unable to build a strong research profile quickly. Many oral health practitioners pursue an academic career via employment at one of the many dental and oral health schools found in universities throughout the world. However, to assume an academic career requires undertaking further training in a postgraduate speciality programme, a postdoctoral fellowship or pursuit of an advanced research degree. Many of the research higher degree studies are conducted within dental schools, but some take place within public health and medical faculties.

Several universities offer higher research degrees. Each has its own application and selection process and even different higher degree models. In any case, the training of researchers is a process that requires a considerable period of time and relates to the local level of scientific research and technological development and innovation; nonetheless, it stills has its own dynamics. This is usually between three and five years of postgraduate education. Therefore, as in all professions, the interest in continuing this process has a strong vocational component.

Many universities have the capacity to train researchers. However, the training of a researcher starts well before tertiary education. It starts with a solid and well-established secondary education system and the priority assigned to research within the socioeconomic conditions of a nation. Higher degrees can be in the form of Doctor of Philosophy (PhD), Professional doctorates and master's degree by research or by coursework.

These career pathways are delineated in Fig. 11.1.

- Doctor of Philosophy (PhD)—A PhD is the highest degree conferred by a university. The programme implies a substantial piece of original, independent research during a set period of time. A PhD involves extensive, independent research under an expert academic supervisor. You will use your research to write a thesis that makes a positive impact to knowledge in your chosen field.

  The PhD programme models vary in their configurations and students may benefit more from one than others. For example, there is a USA model, a British model, a Canadian model and other European models. A PhD in a British world university (i.e. UK, Australia, NZ, Hong Kong, Singapore, Malaysia, etc.) is based on a 3-year period and usually follows completion of a master's degree. On the other hand, a PhD from the USA is scheduled to be completed in 5 years and includes a range of required courses prior to undertaking the research project.
- Professional doctorates—These courses combine research, coursework and, in some cases, professional work or industry experience. While this is still a research course, professional doctorates are more focused on the improvement of professional practice.
- Research master's degree—A research master's degree is similar to a PhD, but the course duration and final thesis is shorter. These courses can serve as a pathway to a PhD.

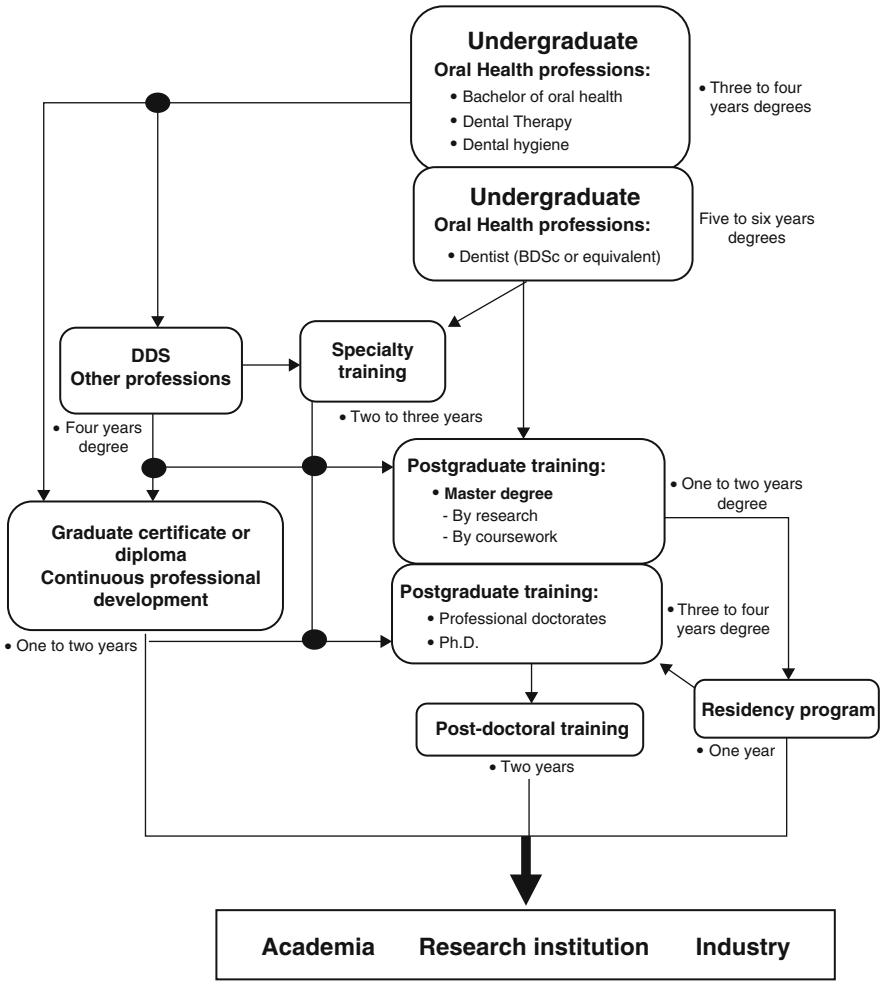

Fig. 11.1 Oral health research pathways

11.6 Research Ethics and Integrity

The object of research is the publication of results. An experiment or study does not exist until the results have been published (Day 1990). Only then, after having been subjected to evaluation by peers from the scientific community, does the study exist. By the same token, the dissemination of results is a fundamental part of any investigation. The publication of results is also an ethical obligation. Moreover, research-funding organisations increasingly require a results-publishing strategy and

request the history of publications, including the researchers' backgrounds, when research grants are applied for. It is also not unusual in research grant proposals to be asked to include a detailed dissemination plan for the research results. Consequently, in addition to developing a research protocol and a research proposal, researchers devote a significant part of the research activity to making the results public.

In addition, most of the studies in oral health are conducted through research on individuals. Some are invasive, such as taking samples of tissue; there are also clinical studies which use procedures that affect individuals. There are also public health studies and epidemiological studies, which typically use questionnaires and oral examinations. There are also procedures involving animals, although this is a different issue from an ethical point of view. However, remember that when animal subjects are used for research, there are ethical guidelines to follow.

11.7 Final Remarks

In the last few decades, research has dramatically changed the oral health of the population. Based on advances in biomedical and social sciences, public health and information technology, new concepts have led to new and innovative health interventions. Research into the reduction of risk factors, the burden of oral health diseases and conditions and the improvement of the effectiveness of community oral health care programmes has reversed oral health inequalities. For example, new cohorts can expect a life free of dental caries. It is also expected that oral health research will increase our understanding of the complexity of oral disorders and conditions in the population and help to position oral health within the wider concept of health and social and personal well-being. These advances require oral health researchers able to translate them into clinical practice, assessing safety, efficacy and effectiveness, ethical considerations, etc. An oral health professional can progress in his/her research career using many different pathways.

As oral health professionals, it is our responsibility to maintain continuous on-going data provision and dialogue conductive to research-informed policies and practices, as well as research focussed on improving the oral health of the population.

For this to happen, the oral health workforce's research capacity should be enhanced. Multiple strategies are needed to attract students to careers in oral health research. Oral health profession students or graduates are normally exposed to several research experiences during their training. A research career can be pursued in different settings such as academia, research institutions and industry. This chapter has endeavoured to provide an overview of the most common pathways to a research career, its challenges and opportunities and the need to ensure the availability of sufficient numbers of researchers to meet present and future patient and community needs.

My Personal Journey in Oral Health Research (Rodrigo J. Mariño)

I fell into studying dentistry on the back of reasonably good marks at school and a strength in science and maths, and obtained a degree in dentistry from the University of Chile. But when I started university, like many at that age, I really had no exact idea of what the profession (dentistry) was about. As I advanced in my undergraduate studies I quickly began to understand that the traditional image of being a dentist, standing behind a chair day after day, providing oral health care to one patient at a time, was very important for individual patients and would certainly improve the patient's health, self-esteem, quality of life, etc., but it was not going to achieve improvements in health at a community level, and that greatly frustrated me.

I worked as a general dental practitioner for a few years, but I always saw myself as someone who would go onto do a speciality. My teacher in dental public health was inspirational, so I decided that I would continue studying public health. At those early stages, I thought that the main issue was to do with the way in which public oral health services are managed, and applied for a Master in Public Health (MPH), majoring in health administration. Studying the MPH, at University of Minnesota, was hard, I did it at my own expenses and although I had saved some money for this purpose, working as a General Dental Practitioner, I had to ask for a loan. It was also my first experience of living in a foreign country. Even though I could communicate well in English, my writing was far from clear and I had to work very hard.

As part of the MPH I had to complete practical training, which I did working for the Oral Health Regional Advisor at the Regional office of the WHO for the Americas, in Washington. This is when I become more interested in epidemiology and data analysis. After completing the practical training period, I stayed working at PAHO for almost 3 years, which paid for the loan incurred to study the MPH. During that time, I established contacts with oral health researchers working at the NIDCR. I knew that to be recognised as a public health specialist in the USA you must complete a residency programme in dental public health and at the NIDCR there was one that qualified for that purpose. Getting a place in that residency programme was the first impulse in my research career. I pushed myself into the residency to learn as much as possible. That was a "defining moment" in many ways. You will come to one of those too, probably more than one.

Since my days as undergraduate I dreamed of completing a PhD, although I always saw it as something far removed and very difficult to achieve. Still, after completing my residency, I decided that I would give myself 5 years to explore the field of dental public health to better decide the area in which I would like to conduct my doctoral dissertation. I also quickly realised that if I wanted to pursue a PhD, I had to learn more statistics, epidemiology and research methods. Thus, one of my more specific goals in the PhD programme was to train myself in statistics.

Two years before my 5 years deadline, I was accepted into a PhD programme at the University of Melbourne. That cemented my training as a public health practitioner. Since then my work has been teaching and research in academia. I have participated in several studies within and outside of oral health. Looking back, I can see that I asked a lot of questions and talked to a lot of people. No doubt there was a fair degree of luck involved, but the old saying is true, that you make your own luck.

While doing my residency programme, I had the opportunity of meeting the Chief Dental Officer of USA. He advised me to ensure that every year I had a new career experience. He said, many colleagues have a new experience one year and then they repeat that same experience for 30 years. Looking backwards, research has provided me with the opportunity to have at least one new experience every year.

My advice to those starting out in a career in oral health research would be, to follow your personal curiosity and imagination, be humble, but proud of your achievements. If you have the opportunity, talk with those who you admire in the profession. Do not be shy or put yourself down, most of them will be happy to talk to you. Look for opportunities to advance your research career, apply for grants, fellowships, early career researchers' opportunities and any available opening that may fit your profile. Be realistic about yourself, but above all do not say "No" to yourself. There is enough frustration in the cycle of submission, rejection and resubmission.

I have meet wonderful people on this journey. I have received a lot of help and impulses to move forward from lots of people, at times without even not knowing that they were helping me as a person or as a professional. Take risks, calculated risks, and invest and believe in yourself, be creative and flexible, find your own path, identify early something that is unique about you, develop that uniqueness and work hard. These will take where you want to arrive professionally.

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A Career in Dental Education

12

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Abstract

For many oral health professionals, an academic career is both appealing and meaningful because it provides the opportunity to impart professional knowledge and skills to the next generation of oral health professionals. An academic career combines clinical skills development with the rewards of teaching others. This chapter will provide the background and context for choosing an academic career, with its many options for development and professional satisfaction. The intention is to make the academic career path more transparent and understandable as an additional choice for any oral health professional. This also entails describing the opportunities to take on leadership and management roles such as becoming a dental Dean or Head of School.

12.1 Introduction

Careers in dental education can follow a number of different paths; these may be full or part-time as well as clinical or nonclinical. The roles and responsibilities will vary both within an institution and definitely between countries, but the key elements will remain the same.

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There is usually an emphasis on education and clinical practice but in many countries there will also be an expectation that academics will undertake research. This combination means that any working week will be varied, involving a wide range of tasks.

In most situations, academics will be employed by an institution and this may give extra benefits not commonly encountered by self-employed clinicians, such as paid holidays or sick leave, and funds for continuing education. The contrast, however, is that the academic salary is usually capped, meaning that it is often not possible to work harder or longer hours to earn more money.

Working in dental education also means that you will have professional career development requirements that exceed those of many other members of the profession. You will be expected to gain higher qualifications in education, research and clinical practice and will be expected to keep up to date in all of these areas.

In this chapter, we will discuss the requirements for becoming a clinical academic but will also describe what is involved for the nonclinical academic.

12.2 What Do You Need to Become an Academic?

The training of an academic is in two main parts, with an additional component for clinical academics. Academic faculty members need to be able to teach but also need to understand how to help students learn. In some countries, a teaching qualification such as a diploma, certificate or degree is required, while in others completing short courses, possibly including a reflective log book, is sufficient. The requirement for a teaching qualification is becoming the norm in many universities around the world. These qualifications focus on aspects of teaching and learning in a university context, conceptual frameworks, course design and evolution, teaching strategies, etc.

In most academic disciplines, research is a key component of working life. Although this varies around the world, in most universities in western countries, the entry level qualification for a research career is Doctor of Philosophy (PhD) or equivalent, which is studied on a full-time basis for between 3 and 5 years. As discussed in Chap. 11, there are several PhD programme models.

A PhD and to a lesser extent a master's degree are considered basic training in research to achieve a level where independent research is possible. However, it is not unusual that after a PhD, many people will work as postdoctoral research assistants in one or two fixed term posts before seeking a faculty position with a view to permanency. The academic career path is a highly competitive one, as there will always be more people doing PhDs and higher degrees, than there are academic openings available.

Clinicians will also undertake clinical training, often to the specialist level, having first achieved basic post-qualification clinical skills. In some universities, this will require a master's degree in the appropriate discipline, while in others a structured

clinical programme of three to 5 years is mandatory. Registration with a clinical board or the dental council is also usually required. However, as described in Chap. 7, there are nonclinical specialities, too. Also in some schools/faculties, it is not unusual that some non-oral health professionals have teaching positions.

As the discussion above demonstrates, the total training time for an academic is many years above that required for a basic clinical qualification. Depending on the practice in the institution employing the academic and on the individual's preference, the various elements can be undertaken concurrently or sequentially.

12.3 What Do You Do as an (Clinical) Academic?

A university provides not only the teaching and learning of knowledge but also the creation of knowledge. Knowledge is created through asking questions, developing hypotheses and searching for evidence to support or refute them. Academics are key to this work and in many universities around a third of a clinician's working week, and a higher proportion of that of non-clinicians, will be spent on this aspect of the role.

How is this achieved? In oral health, most researchers work in teams rather than individually and there are many topics under investigation including materials science, basic biological processes, pathology, epidemiology, health services research and clinical trials. Researchers may be allowed to research within their role without seeking additional funding, but most commonly they will be expected to prepare applications for funding and win research grants. The research may be carried out in laboratories or with human subjects, requiring an understanding of ethical processes as well as scientific method. The authors note that some very successful research collaborations have been achieved by clinicians and non-clinicians working together, defining and answering questions.

The next phase is to write up and report the research findings and to disseminate the results. Usually, dissemination of research outcomes happens through publication in dental journals. However, it could also be through presentations at conferences and scientific meetings, newsletter, or seeking to have the findings included in government or other policy.

Also, as described in Chap. 1, there is a growing emphasis on cross-disciplinary work, and cross-institutional work is becoming increasingly common.

Lastly, this section on research must describe the supervision and training of researchers. An active researcher will be expected to lead a research group which might consist of PhD students and postdoctoral researchers as well as junior faculty. There is also an expectation that researchers will build skills in career development and people management at an earlier stage than in other academic roles.

12.3.1 Educate

- Teach
- Assess
- Design and modify courses
- Identify learning styles
- Pastoral responsibilities

Teaching and learning is absolutely core to the academic's working life. The communication of ideas and skills, as well as the ability to encourage people to develop their own ideas and skills, are crucial areas for development. An academic needs to learn how to teach effectively and how learning styles may vary with people's ages and backgrounds. They also need skills to rigorously assess the success of that learning. They will design and modify programmes and courses in terms of content and delivery, for example, looking at different technological solutions. A further element to teaching and learning is selecting the correct students for admission to the course, providing support and remediation and ensuring the pastoral care of students, at times identifying those who need the support of more formal systems than the academic is able to provide.

12.3.2 Clinical Practice

The oral health professions are practical in nature, and the majority of academics maintain and develop their clinical skills by maintaining clinical practice. Their clinical practice will often be central to their academic career, with their patients potentially shared with students or being part of their research projects, for example, being included in clinical trials.

12.3.3 Management and Leadership

The first stages of management and leadership start most commonly with the management of other staff but equally involve the management of courses and the design and development of modules. The most common management skills required are in financial and people management, administration, team leading, delegation and communication.

12.4 Clinicians, a Discussion of the Role of Full Time/Part Time/ Specialist/Generalist

Dental schools employ clinicians to provide treatment to patients, carry out research involving patients and to oversee treatment provided by undergraduate and post-graduate dental students. In addition, many clinical staff also engage in some form of

teaching and clinical research. These clinicians may be full-time academic staff, or part-time staff, who are often employed to do sessional teaching. Some clinicians employed by universities only work during the weeks of the year when student clinics are running. It is important that those who teach in the clinic are themselves good clinicians with good teaching skills, so that they can help dental students become competent dentists.

Many full-time academic staff engage in some clinical teaching or clinical practice, in addition to their other roles. This provides variety in their work, maintains their clinical abilities and in some cases provides additional income. In most countries, dentists and specialists, including those working in universities, need to maintain clinical practice in order to stay registered with their Dental Council or Dental Board (See Chap. 2).

Providing clinical treatment in a dental school environment can have its advantages: usually, the equipment and materials available are of a good standard; there are clinical specialists on site who can give advice or assistance; clinicians can sometimes take part in clinical research projects; there are many opportunities at the university for continuing education and there is ready access to the library, e-journals and other educational resources. Private dentists who teach part-time at dental schools often find that their private patients value this connection, and it can enhance their reputation.

Dental school clinicians may be general practitioners or specialists. Specialists generally focus their teaching and practice on their specialty area and can provide treatment which may be beyond the ability of most general practitioners. For postgraduate students, clinical supervision is generally provided only by specialists.

Most clinical tutors enjoy their time supervising dental students. Apart from being a nice change from the normal routine of daily private practice, tutors may enjoy the stimulation of working in an academic environment with university staff and students. It can be rewarding for clinical tutors to see students improving their skills and developing into good clinicians over time. But it can also be stressful at times, for example, when students make mistakes, or when there are many students to supervise at the same time, or when the clinic is running late.

12.5 The Academic Hierarchy: Tenure and Promotion

It is clear from the description above that academics can fill a variety of roles within dental schools. Most dental schools have a system of managing these roles and how an academic progresses from one position to the next. Often, as part of the university or dental school human resources policies, a performance assessment system is established requiring academics on a regular basis (typically, annually) to account for what has been achieved during the reporting period in the three main areas of teaching, research and service/clinical. In a departmental system the academic will report to the department chair, who will be responsible for this process. Typically, a standardized framework will gather information such as: what courses have been taught, what research projects have been undertaken, what grants have been applied

Table 12.1 Departmental system and academic ranks

Level	Title	Notes
E	Professor	This rank is only given to those who have demonstrated outstanding competence and academic leadership in research, teaching and service, as well as achieving international recognition of their scholarship
D	Associate professor	Academics appointed to level D are developing a very strong international profile and have demonstrated sustained high competence in both teaching and research
C	Senior lecturer	Equivalent to associate professor in north American universities (though without any particular implications in terms of tenure). Normally, academic staff demonstrating sustained competence in research and teaching are promoted to this rank after 4–6 years of service at the rank of lecturer
B	Lecturer	Equivalent to assistant professor in North American universities. This is the usual entry level appointment for new full-time academics, either permanent or on temporary contract. Appointment at level B typically requires the candidate to possess a PhD
A	Associate lecturer/tutor	Appointments at this level are usually for new academics. Some positions at level A are occupied by those with extensive industry experience relevant to teaching and research, but who do not possess a PhD

Source: University of Melbourne (2012); Academic ranks (Australia and New Zealand). https://en.wikipedia.org/wiki/Academic_ranks_(Australia_and_New_Zealand)

for/received, what papers have been published, in which areas of the university or the community life the academic has been active, etc.? Importantly, the process also entails a discussion of the personal and academic goals for the upcoming year, which provides an opportunity for laying out a strategy for academic improvement and focus with the intention of applying for promotion in the future.

Academics are also in a good position to provide feedback to university management on issues around engagement and learning. This feedback is necessary since, as with any industry, good management will increase productivity in terms of research, student satisfaction and a wider set of metrics (McCormack et al. 2013).

When you choose a career as an academic, you also implicitly accept that you will enter a hierarchical system, most likely at the bottom, through which you can progress by promotion based on competence and seniority, depending on the rules and traditions of the institution. Although academic appointments' nomenclature may vary among countries, academic hierarchies normally range from level A (entry level) to level E (Chair and Professor). Such a hierarchy is illustrated in Table 12.1, which may typify the situation in a dental school with a departmental structure, where some academic reports upwards to the Chair, who in turn reports to the Dean. Typically, the university/school bylaws also specify a committee called the "Academic Rank and Tenure Committee" or "Tenure and Promotions Committee", consisting of elected or appointed members of the faculty, who will conduct an internal assessment of academics who apply to be employed or promoted. In

particular, for full-time academics, this system provides the basis for promotion and tenure.

Academic appointments can be made on a continuing basis, fixed-term or sessional and casual basis. The traditional role for an academic includes a mix of teaching, research and other academic commitments: typically, teaching (40% of the time), research (another 40%) and leadership in the field and services to the community (20%). However, there are also research-only academics, who spend most of their time conducting research with limited or no teaching commitments, although supervision of PG and higher degree students may be part of their role. Another type of academic is the teaching academic, who has little or no time allocated for research in their role.

Tenure is a valued academic tradition to ensure excellent faculty staff have academic freedom to conduct teaching, research and service activities without fear of administrative or political pressures and to provide financial security for faculty who have demonstrated excellence. With the award of tenure comes the additional responsibilities of mentoring junior faculty, modeling continued commitment to academic excellence and governance to ensure the continued improvement of the university and the dental school. It must be pointed out that tenure is not an entitlement. Increasingly, institutions have replaced the traditional tenure system with other forms of employment, but it is still a dominant feature linked to the promotion process. Typically, this process is undertaken when being promoted from Assistant to Associate Professor, which may take place after 4–7 years of academic employment.

12.6 Discussion on Different Types of Oral Health Professionals

12.6.1 Non-clinicians

- Commonest disciplines found in dental education establishments, e.g. basic sciences, behavioural sciences
- How to develop career
- What is expected

The most common disciplines of non-clinicians in a dental school are from basic sciences, population oral health, epidemiology, biostatistics and behavioural sciences. Their careers will develop as outlined above but without the clinical component. A real danger for this group of people is that they can become isolated from their own disciplines and it is incumbent upon them to ensure that they remain up to date and in touch.

12.6.2 What Does a Head of School/Dean Do?

In "olden" times, it was not unusual for an institution to promote a Senior Professor to a Deanship, mostly based on seniority. With the increasing complexity of academic institutions and their roles in society and the increasing professionalization in academia, university leaders, such as Deans and Heads of School, will now be recruited for a fixed term (5 years extendable) after a lengthy, often international, search process.

Rather than trying to describe and enumerate the high expectations of a Dean position, a recent Dean search announcement is illustrated in the Appendix. As indicated here, there is almost nothing left to the imagination in terms of expectations for this individual. It is fair to ask how you could realistically prepare or train for a position like this, and the answer might be that you can't, at least not in a straightforward way as though training for a defined dental specialty.

However, as has been pointed out by Van Cleve Morris (1981) in his book, *Deaning: Middle Management in Academe*, the role of the Dean is that of being a middle manager in academia. This implies that skills in leadership, management, administration, finance, human resources, etc. are highly valued and necessary. As foreign as some of these expectations sound for a dental school, there are numerous pathways to obtaining these abilities.

Typically, such skills can be achieved by choosing specific, strategic roles during one's academic career, such as committee or board memberships or other academic leadership roles inside or outside the university. These skills can also be achieved through formal postgraduate training in academic leadership, such as a Master of Public Health or Master of Business Administration degree or similar, some of which may be taken as an executive programme (i.e. part-time studies, while you are employed in a regular job). There are now also tailor-made courses in dental school leadership, such as those mounted by the American Dental Education Association, some of which can be done executive style or online (American Dental Education Association 2017).

12.7 Final Remarks

Many oral health professionals stay in academia and use their knowledge and skills to train the future oral health workforce. This chapter included the experience of senior oral health professionals involved in academia in order to help others decide whether academia could be the right career path. They shared their own career paths, experiences and knowledge of the academic environment and work opportunities. Whether or not an academic career is right for everyone is a personal decision. You have to think about what you enjoy doing: teaching, research or a combination of both? You need to be passionate and committed about academia. An academic career path is a highly competitive one. Preparing grants, securing research money and getting published can be frustrating tasks. In addition, teaching or administrative duties may restrict the potential for research. However, if you decide that academia is

the right path, you will find that there are many opportunities to excel and contribute as a teacher and mentor of the future workforce, in research and to advance the oral health of the community. Academia can also offer stability and job security, but more importantly the opportunity to embrace new roles and new challenges almost every year.

The chapter has outlined the requirements for entry to this career path and the duties that typically must be undertaken by oral health professionals who aspire to pursue this path. It highlighted the various challenges that an oral health professional must face in order to be able to progress his/her career in academia and the potential rewards. The chapter also provided a background and overall perspective on the issues involved in dental academia to gain a good understanding of the current and future academic context.

A Personal View: Elizabeth Treasure

I am writing this during the (students') long vacation. Contrary to popular opinion, one benefit of working in the education sector is *not* the long holidays: there is just different work to do while they are away.

As I've been preparing to write this section I've been reflecting on the changes in dental education over my career. I have to start by recording that when I graduated from dental school there was not one female professor in the UK and at my school not even a senior lecturer who was a woman. I've seen considerable change in the gender make up of both students, staff and finally senior staff.

My own career has been a mixture of clinical and academic posts with specialization in dental public health. I started with a major interest in paediatric dentistry and quickly had the opportunity to study for a PhD. Then followed a variety of clinical posts and an early move into health service management before emigrating to New Zealand and becoming a full-time academic. Returning to the UK, I continued as an academic in dental public health, teaching, researching and maintaining clinical practice. I rapidly assumed various leadership roles before becoming Dean of the Dental School and General Manager of the Dental Hospital. The school required a restructure on academic grounds which also ensured its financial viability and this was a period of very hard work.

I have always enjoyed working with other parts of the university and so when the opportunity presented I was delighted to be appointed as the sole Deputy Vice-chancellor in a large, multi-disciplinary, research-intensive university. I'm also a school governor, active in my local church, and a trustee of a small charity which works in Lesotho. A final role is that I am a non-executive board member of the local National Health Service organization which provides all health care from primary care to tertiary services and there I chair the quality, safety and patient experience committee.

There is no question in my mind that while an academic career has proven to be hard work, it has had huge benefits and I've been privileged to enjoy my working life. I've worked in New Zealand as well as the UK and have been able to include a certain amount of travel with projects in places such as Peru. It has certainly not always been fun. There have been hard times with really tough decisions to make,

such as when I led the school restructure. There have been boring times—marking exam papers has to be done carefully and with concentration but can be tedious.

As well as ensuring my academic, clinical and research skills were fit for purpose I have had to develop leadership and management skills as well as soft political skills. Over time I've completed several leadership and management courses although unlike some colleagues I have no formal qualification in these areas. Leadership, management, developing and implementing strategy, governance, finance, human resources and project management are all topics I've worked on developing or at least understanding.

My weeks have always been very varied. When I was a full-time dental academic, the guideline was one-third teaching, one-third researching and one-third clinical. Teaching might mean lectures, clinical supervision, small group work or research supervision. As I've moved into leadership and management roles, the balance has changed and now my time is almost entirely spent ensuring that the university creates a space where others—staff and students—can succeed.

What decisions did I make to allow me to have this career? I have taken each step one at a time and built on the strengths I've developed. As I said at the beginning of this reflection, women just were not in senior positions when I started, so there were no role models. I've applied for jobs because they looked like an interesting next step rather than as a set plan. This means I've sometimes done things in an odd order. For example, I did my PhD very early and before my clinical training. I have probably planned only one job ahead but I've done that by looking at job advertisements, examining what was being asked for and making sure I can offer that.

For me the key satisfaction of a career in dental education and research has been to solve problems and to help others achieve things they want. It has also been a very great pleasure to work closely with colleagues from many parts of the world.

Since writing my personal view, I have succeeded in being appointed as Vice-chancellor (known as President in many countries) of Aberystwyth University. Aberystwyth is a relatively small research-led university with a proud history stretching back nearly 150 years. It has world-leading research in biological sciences, particularly agriculture, international politics, computer science and geography. It also has a huge role in providing education for the people of Wales through the medium of Welsh as well as English. As well as leading this university into its next phase, I am also enjoying the challenge of learning Welsh.

A Personal View: Callum Durward

For the past 11 years, I have been working as Dean at two dental schools in Cambodia. Prior to shifting to Cambodia, I taught at a dental school and dental therapy school, worked in a hospital and was a principal dental officer for a school dental service in New Zealand. Dentistry has given me an opportunity to work in many different fields over the past 36 years, including teaching, research, private practice, public health, administration and international development.

Here in Cambodia, apart from my work at the university, I also work part-time as a paediatric dentist and part-time with a local NGO called One-2-One Cambodia. Working in Cambodia has provided me with many opportunities to put my

knowledge and skills to good use. This work has given me a lot of satisfaction over the years, and although there are many challenges, there are also many rewards.

When I first came to Cambodia in 1990, after working in refugee camps for several years, there were only 34 dentists who had survived the Khmer Rouge "reign of terror". The national dental school had a severe shortage of lecturers and facilities. I worked with an American NGO (World Concern) which helped support the development of the national dental school, was instrumental in setting up the first dental nurse (therapy) school and helped organize Cambodia's first national oral health survey. It was an exciting time, as Cambodia was still under communist rule and was in the early stages of recovery following the genocide.

As an overseas dentist with postgraduate qualifications, there have been many opportunities to contribute to the development of dental education and dental services here. I see one of my main roles as helping to build the capacity and leadership of the local dental professionals and working in a dental school is an ideal place for this. In my present position as Dean, I not only have the opportunity to teach students, but I am also involved with curriculum development, administration, visits by overseas lecturers, workshops and conferences, a range of research projects, regional academic meetings and interacting with colleagues at the Ministries of Health and Education to strengthen oral health programmes and policies.

Although most of my time is spent at the university, I also work with the local NGO One-2-One Cambodia. This organization has mainly medical and dental programmes which provide health services to the poor. Many local and international students and dentists volunteer with One-2-One. Recently, One-2-One celebrated a milestone in the "SEAL Cambodia" project, in which several collaborating organizations sealed the teeth of 60,000 grade 1 and 2 children over a 3-year period. We are now focusing on a new project called "Healthy Kids Cambodia", which provides a range of basic health and dental care services for school children. Dental students from my university are involved in this project, as well as a weekly prison dental service, and the SEAL Cambodia project. I am also part of a group called Friends of Clefts in Cambodia (FCIC), which is helping to develop multidisciplinary cleft services for the first time. Taking part in these projects is very satisfying, as I know we are making a positive difference in people's lives.

Another area of involvement is research. Cambodia has published very little research in the area of oral health. And yet research, especially research which investigates local oral health problems and evaluates programmes that have been implemented, can be very useful for informing public health policies. It has been rewarding to work with Cambodian colleagues to carry out research to answer important questions relevant to the oral health situation here.

Living in a different country, with a different language, culture and way of doing things can have its challenges. Some people thrive in such an environment, but others struggle to fit in, make friends and cope with the many daily frustrations and lack of funding. Such work is not for everyone. In fact, there are only limited opportunities for people who want to work in a developing country long term. And reimbursement is usually a lot lower than in western countries.

My years in Cambodia have passed very quickly. I hope I have been able to contribute in some way to improving dental education and oral health services for the Cambodian people. Although there have been many challenges, it has been a very rewarding part of my life.

A Personal View: Eli Schwarz

Oftentimes, I think back to a piece of advice my dad—who practiced dentistry for over 50 years—gave me during my first year in dental school. I thought it would be a great idea to take a year off, get away from it all and travel. His advice was to complete dental school and get my degree, because with my skills as a dentist I would be able to travel anywhere I wanted and contribute much more to humanity than just "wasting time" doing odd jobs. After a professional dental career of more than 40 years, which has allowed me to pursue my professional goals from Denmark to Israel to Hong Kong to USA to Australia and now back to USA, I have to admit that he was right—at least to a certain degree. He believed that most of our professional skills were linked to our technical hand skills, whereas I developed the belief that our entire basic science, clinical sciences and social sciences knowledge could be used more broadly than merely to provide dental care for one patient at a time in my own little clinic.

Public health had already become a passion of mine as a senior dental student in Copenhagen, Denmark. This led me to seek postgraduate training in public health abroad (MPH in Jerusalem, Israel) and encouraged me to continue to conduct research trying to unravel dental care access inequalities and social determinants of young Danish people in health services, which was the basis of my PhD. I had the opportunity to share my time between my work as an Assistant, later Associate Professor, at the dental school and being a healthcare administrator in the Danish Department of Health. This combination was unique; I was involved in "big picture" planning and decision making with considerable implications for the practice of dentistry in the country as well as teaching and engaging with dental and dental hygiene students in community dentistry. It has taught me that even seemingly incommensurate tasks can be learning experiences as long as you are receptive to the world around you and try to find possible connections between them.

I left my job as the Chief Dental Officer of Denmark to take up the position of Professor in Public Health at the School of Dentistry at the University of Hong Kong, which was another unique experience. It provided the opportunity to immerse myself in a very different lifestyle and culture and offered a rich research environment both within Hong Kong and in China, which was greatly opening up in the 1990s bringing an increasing number of postgraduate students for master and PhD training. During these years, I also was engaged in academic administration, as Head of Department, Associate Dean and in my last year there as Interim Dean.

I then switched almost entirely to an administrative role as the executive director of the American and International Associations for Dental Research (IADR and AADR) based in Virginia, USA. To be something like the head of the global village of dental research was immensely gratifying and provided an entrance into the world's richest and widest dental research arena, which in fact has ramifications

for academics in many parts of the world. It also gave me an insight into the important relationships between academics and the dental industry.

My last two positions, as the Dean of the Faculty of Dentistry, University of Sydney, and Chair of Community Dentistry at Oregon Health & Science University, have been like a return to my roots. I can attest to the earlier description of the Dean job as a multifaceted, highly charged managing position, where you never know what crisis or drama the day will bring. As the Dean you are always "on". To be a Chair is a bit more predictable and also provides a better balance between academic pursuits such as teaching and research while at the same time requiring some administrative chores. Because of Oregon's role as a trailblazer in healthcare transformation, with an emphasis on physical–mental–dental health integration, I am now engaged in several government bodies which consider the implementation of new healthcare quality metrics, public health modernization, etc.

I am aware, and often get reminded, that my professional career has been somewhat unusual. The one thing that it has taught me is that just because you have a degree in an interesting field and just because you choose to create a career as an academic does not mean that your pathway in life is narrowly laid out. There are many options and opportunities that offer themselves throughout. The other thing that has been of huge importance in my career is the role of mentors, older colleagues who have at each step of the way been willing to share their own experiences and assist me to reach my potential in my endeavours. Now, every time I get approached by a younger colleague for advice or direction, I remind myself of those instances in my life where I was in that person's shoes and hope I can contribute similarly to his or her career success.

Appendix

Dean Search Announcement: XYZ School of Dentistry
The Dean of the XYZ School of Dentistry reports to the Executive Vice Chancellor and Provost. Appointments are reviewed every 5 years. The Dean plays a key leadership role in advancing the mission, operations and service of the School, with complete responsibility for personnel, general administration and management, budget, academic and development functions.

- **Key Priorities**:
  - Set strategic direction for the School based on an assessment of strengths and needs relative to the university's priorities and the unique roles that XYZ assumes within the state university system;
  - Develop a clear identity for the School;
  - Recruit, retain and engage the best faculty members, enhance their career development and empower them to participate in school governance;
  - Promote quality, innovation and scholarship in Dental education and practice arenas;
  - Play a key role in raising funds for a development campaign;

  - Increase research activities and grow the school's externally funded research portfolio, and prominence within the Dental science community;
  - Prepare for accreditation;
  - Ensure sound financial and operational management;
  - Provide oversight regarding the role and activities of the Dental Faculty Practice;
  - Facilitate collaboration with other university schools/units, clinical entities, XYZ Health Care and community-based agencies to foster interprofessional education, research, clinical, community outreach and other school priorities.
- **Specific Responsibilities**: Executive Leadership—Provide leadership for strategic planning; Provide leadership in the development, implementation and review of academic, administrative and governance policies and procedures in all major areas of operation; Provide leadership, instructions, guidance and/or counsel to school faculty members, staff and administrators, resolving problems at the school level; Provide leadership in establishing the school's objectives and develop and manage all resources essential to the achievement of these objectives; Interpret and implement university policies at the school level.
- **Academic Oversight**: Recruit and retain top faculty members and Department Chairs who will achieve high standards of excellence and will enhance the cultural and ethnic diversity of the School and University; Evaluate faculty members for appointment, tenure and promotion, in accordance with the School's appointments, promotion and tenure committees; Provide leadership and oversight to academic programmes. Encourage, review and support continuous improvement of programmes and curriculum; Evaluate and approve all curricular changes, advising functions and student recruitment and retention actions and initiatives; Promote and provide oversight to research programmes and grants; Plan and report research activities.
- **Financial Management**: Oversee the financial management of the school; Develop, monitor and advise sub-units on budgets and fiscal management; Allocate current expenses, capital equipment and personnel budgets; Manage school-wide resource acquisition and utilization.
- **External Relations**: Serve as the primary advocate and spokesperson for the school; Lead and direct school outreach activities, including serving as a principal representative of the school in relation with local external constituencies (e.g. advisory boards, alumni, legislators, media, community leaders, business and professional organizations, etc.); Cultivate and solicit individual donors, foundations and corporations; Lead the school's development efforts and ensure that campaign priorities are consistent with the school's academic vision; Represent the school to the university administration and at appropriate university bodies, committees and councils.

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Part V

Health and Retirement Issues

Health and Retirement

13

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Abstract

This chapter deals with the occupational health and safety concerns faced by oral health professionals, as well as how they may prepare for and enjoy their retirement. The most common occupational health hazards experienced by oral health professionals include physical dangers, such as blood-borne viruses, therapeutic radiation and biomaterial chemicals, harmful noise, vibration, and ergonomic stress. Many dentists may also encounter psychological stress and occasionally even workplace violence. Retirement is both a psychological and a social phenomenon, with personal and financial implications, all influenced by individual and cultural characteristics. It is a stage of life usually associated with reduced activity, responsibility, and stress; however, there are many pathways to approaching and preparing for retirement and oral health professionals are encouraged to consider the broad range of approaches that may be taken in this stage of their professional lives.

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13.1 Introduction

The words "occupational health" and "retirement" are closely connected, carrying positive and negative connotations and raising many questions and challenges for all oral health professionals. In every profession, even in modern times, occupational health risks are a reality which must be managed and there are many ways to address or minimize their consequences. Occupational health concerns in dentistry most often impact hearing, musculoskeletal function, and psychological equilibrium. Approaching retirement is often steeped in uncertainty and poses financial, psychological, and emotional challenges.

This chapter presents an overview of occupational health and retirement from the perspectives of the authors who are academic dentists—three retired and two approaching retirement. Just as any profession must address the possibilities, uncertainties, and long-term effects of leaving the workforce, the authors offer approaches and strategies for this stage, such as what to consider, when to start planning the decision, as well as some of the financial and emotional aspects of leaving the oral health workforce. They identify key themes emerging from the literature on health and retirement, including preretirement issues. This chapter is organized into two main sections covering preretirement and retirement, followed by case studies offering intimate insights into the authors' expectations and experiences of retirement.

13.2 Occupational Health Concerns of Dental Practice

Oral health professionals, despite the standards and regulations which minimize the health hazards of dental practice, are at risk of various physical dangers, such as blood-borne viruses, therapeutic radiation, and biomaterial chemicals (Centers for Disease Control and Prevention 2016; Occupational Safety and Health Administration 2017). They are also exposed to harmful noise, vibration, and ergonomic stress and occasionally to workplace violence and other sources of psychological stress. Of course, personal characteristics will mediate the effects of exposure to any of these hazards (Gorter et al. 2000); however, there is evidence that the stresses of clinical practice begin in dental school where the environment can be more hostile than in other health programs (Omigbodun et al. 2006; Birks et al. 2009; Murphy et al. 2009).

It has been well documented that dentists suffer a high rate of depression and even suicide (Rada and Johnson-Leong 2004; Te Brake et al. 2008). Fortunately, the ill-effects of stress can be reduced by enhancing a personal sense of coherence through the support of family and friends and through programs offered by professional organizations that help build personal confidence. Even dental students can benefit from their own social supports and the stress reducing potential of vocational orientation programs provided by dental faculties and local professional organizations (Muirhead and Locker 2008; Gambetta et al. 2013).

13.3 Retirement: A Phenomenon

Retirement as a social and psychological phenomenon relates to a stage of life, typically in older age, in which people withdraw fully or partially from paid labor (Wang and Shi 2014). It is a fuzzy concept, like old age, influenced by social conditions, community economic well-being, and beliefs about overall care of older people (Denton and Spencer 2009). It is also a state of mind with social, personal, and financial implications, all influenced by individual and cultural characteristics (Fasbender et al. 2015). It is a stage of life usually associated with reduced activity, responsibility, and stress (Wang and Shi 2014); nonetheless, retirees who do some paid work seem to be happier than those who do not, probably because work is familiar and it can be stressfully disruptive to stop (Zhan et al. 2009). Retirement for some also has a temporal perspective when people "un-retire" and "re-retire" through new careers or by changing from full to part-time work (Schultz and Wang 2011).

Clearly, retirement is an important social experience with a discourse increasingly set around constructing a lifestyle that sustains physical and mental fitness, prevents illness, restructures routines, values meaningful time and interactions with others, engages in civic responsibilities, and acquires new skills (Denton and Spencer 2009). Volunteering, for example, is a common activity that attracts retirees. Volunteering can enhance health and functional activity, reduce depression, and lower mortality, probably by increasing social, physical, and cognitive activities (Anderson et al. 2014). About one-in-three Canadian seniors volunteered formally in 2004 through specific organizations, and two-in-three helped others informally with domestic and other personal assistance (Employment and Social Development Canada 2016).

Opinions on retirement vary considerably both within and between countries. The Pew Research Centre (2014) found that the distribution of public anxiety about aging varied considerably around the globe. For example, nearly nine-in-ten Japanese, but only about one-in-five Americans, believe that the growing number of older people is a major problem. Europeans are less confident than Americans about their standard of living in old age, possibly because they feel less secure about the economy, which seems to be a global phenomenon whereby confidence in standards of living is closely associated with perception of financial security (Helman et al. 2014). Economic growth and a preference for personal over social responsibility in the USA boost economic confidence, whereas in Europe the reduction in the proportion of working-age to old age groups tends to forebode economic gloom. Americans are now worrying about the rising cost of health care in retirement (McCarthy 2016). Canadians, in contrast, benefit from different policies on pensions and health care and seem financially confident about their future (The Canadian Press 2016).

13.3.1 Trends

Less affluent countries spend about 2% of their gross domestic product (GDP) on social programs including pensions, while more affluent countries spend considerably more, although not necessarily in direct proportion to their affluence. For example, in 2010, pensions alone as a share of the GDP amounted to 6.8% in the USA, but 15.6% in Italy which has a much weaker economy (Pew Research Centre 2014). There is little enthusiasm among employers within the European Union for raising the retirement age to keep older people in the workforce; consequently, the share of GDP used for pensions and health care globally is likely to rise rather than fall in the foreseeable future (van Dalen et al. 2010). On the other hand, poverty among retired people in Japan is disturbingly high, and in Africa and Asia there are few state-sponsored social supports for older people (National Institute of Aging 2011). Overall, financial security in retirement is threatened by an old age dependency ratio that reflects an increasing proportion of retired people relative to a younger workforce. This ratio has been strongly influenced since the 1950s by increasing life expectancy and a trend towards early retirement, more so for men than for women, although in the 1990s the trend began to reverse, again more among men than among women.

Most affluent countries have experienced a drop in the official retirement age, certainly in relation to life expectancy. In Taiwan, for instance, it dropped below 55 years in 2004 (National Institute of Aging 2011). Men in countries of the Organization for Economic Co-Operation and Development (OECD) in 1960 spent on average 46 years working and 1 year in retirement (National Institute of Aging 2011); whereas, in Italy men and women retired on average at 59 years in 2009 and at 66 years in 2017, with an average life expectancy now of 82 years. Consequently, with increasing life expectancy everywhere, retirement occupies a potentially larger segment of life than ever before, although current economic strains might be slowing if not reversing this trend.

13.3.2 Planning

Estimates suggest that only about one-in-three Americans, and slightly less than one-in-two aged over 45, give much thought to financial planning for retirement (Federal Reserve System 2015). Even more unsettling is the estimate that about one in three non-retired respondents has no pension or retirement savings. Apparently, the pressures and practicalities of life in the USA leave little room for gazing into the future. A quick search on the internet using the prompt: "*are you ready for retirement?*" reveals a number of sites, mostly from the USA, on how to prepare for retirement. They focus on what to expect realistically and on how to meet the financial and healthcare needs.

The "Retirement Confidence Survey" in 2017 found that again about one-in-three American workers were stressed by preparations for retirement (Greenwald et al. 2017). Although most of the respondents had sufficient money to stop working, they

worried about what they would do, how much money they would need, and whether or not they should change their place of residence. Another survey also in the USA revealed that many respondents hoped to mix work and leisure in retirement through flexible part-time jobs (Merrill Lynch 2013). Countries such as Australia and Canada have policies that encourage partial or gradual retirement where workers can simultaneously receive earnings and draw resources from their pension funds (Australian Government 2015; Financial Consumer Agency of Canada 2013). However, the proportion of retired people who continue to work or who "bridge" into retirement is typically only between 2 and 6%, but has been as high as 15% in some countries (McDonald and Donahue 2011). Motivation to work after retirement, which can be explained by continuity theory and role theory, is driven largely by good health and financial pressures whereby voluntary employment, rather than forced "bridge-employment," is psychologically, physically, and financially beneficial, particularly if the retiree continues the same or similar line of work as before (Zhan et al. 2009). On the other hand, those who wish to change could benefit from the freedom to adopt and practice other lifestyles (Insler 2014). In Australia, it is not uncommon for retired people, even from the health professions, to have part-time jobs. Some continue working on familiar projects or venture into new areas related to their former work, while others view retirement as an opportunity for a total change of career. Indeed, surveys in Germany (Fasbender et al. 2015) and China (Zhan et al. 2015) revealed that many retired academics, men more than women, continue writing and consulting, probably to retain their personal and social identities in addition to intellectual stimulation and satisfaction, rather than financial gain.

13.3.3 Expectations

Hopes for retirement typically focus on aspirations for longer, healthier, and more balanced lives (My Retirement Works 2017). There are now more women than ever before qualifying for pensions (McDonald and Donahue 2011). The average expected years of retirement in 2014 for women within the OECD countries was 22.3 years and for men 17.6 years, with the highest expectancy in France (women: 27 years; men: 23 years) and the lowest in Korea (women: 16.6 years; men: 11.4 years) (OECD 2015). Moreover, it is likely that there will be an increasing demand for early retirement because work generally is becoming more mentally stressful, voluminous and time-dependent. The reasons for retiring are changing to include more negative factors such as part-time or insecure employment, forced unemployment, unexpected early retirement, caregiving, and personal disability (Greenwald et al. 2017). In Canada, for example, over one-third of the working population is employed in "nonstandard" or insecure jobs with limited or no pension plans (McDonald and Donahue 2011).

Men—especially wealthy men with financial advisors—usually have higher and more confident expectations than women, and older rather than younger workers in the USA have higher financial expectations from government or employer-defined pensions when available (Merrill Lynch 2013). Indeed, among professional groups

with good incomes, and in countries with generous retirement benefits, there is a general expectation of financial security and many sources of financial advice. Dentists, for example, can find several web-based sites with advice on planning for retirement, lifestyle choices, and ways to continue their professional engagements after retirement. The Association of Retiring Dentists (2017), for example, is a global organization, although based in the USA, formed in 2008 "to create and maintain an organization of resources through education and the exchange of experiences on both sides of retirement."

13.3.4 Stages of Retirement

A typical retiree, according to Dychtwald (2016), moves through four stages to establish priorities, plans, and social connections before and after retirement:

Stage One: 5 years or less before retirement to wind down from work and anticipate future opportunities.
Stage Two: 5 years of liberation and self-discovery after retirement for personal growth and adventure to establish a new identity.
Stage Three: Up to 15 years of expanding freedom and choice within the new identity.
Stage Four: Final contentment and accommodation to simplify life, maintain health and independence, and enjoy established activities.

Life in retirement is usually better or about the same as it was before (Carstensen 2011). Indeed, happiness from retirement seems to depend more on the circumstances driving the decision, whether chosen or forced, rather than on the extent of the retirement (Calvo et al. 2009). The transition to retirement has been described as "a honeymoon, followed by a steep decline [in happiness], and then followed by a final stable period . . . depleted by the ruins of inactivity, including cognitive and physical decline" (Horner 2014). This bleak portrait is tempered by several factors aiding or hindering happiness, such as the availability of planning and social networks that influence perceptions of control over the decision to retire. Couples increasingly make joint decisions to achieve the financial goals necessary for peace of mind, rather than the accumulation of wealth for its own sake (Dendinger et al. 2005). Indeed, retirement can affect men and women differently and produce new stresses in relationships, usually relating to space and togetherness, especially when there are expectations of traditional male and female gender roles (Stancanelli 2014) or when confronted by the "retired husband syndrome" (van Solinge and Henkens 2005).

13.4 Retirement and Health

Serious health problems can be particularly disruptive to the timing, lifestyle, and financial security of retirement (Zhan et al. 2009). The expense of dentistry, for instance, can be a source of considerable worry without state-sponsored social benefits (Yao and MacEntee 2014). However, overall, it is unclear whether or not retirement improves or worsens health. Some argue that it enhances health behavior because there is more time for healthy activities (Hessel 2016). Data from surveys every other year of Americans over age 50, revealed that a small proportion of respondents who smoked before retirement stopped smoking after retirement, and that there was a growing interest in physical exercise (Insler 2014). Aging, of course, is a process of physical stress and strain for most people, during which the risk of chronic diseases increases (Moon et al. 2012). However, the freedom of retirement also offers the possibility of additional time to appraise and cope with the emotions of chronic illness (Lazarus 2006; Westerlund et al. 2010). Some people retire because they are experiencing the onset of illness, and the negative effect of retirement on health is stronger among people who are forced or encouraged to retire or who have had an unhappy life (Sonnega et al. 2014). Either way, retirement can be a highly stressful event, with many people turning to counselors and others to coach them successfully through the transition (Goodman et al. 2006).

13.5 Conclusion

Oral health profession students, as well as practitioners, need to be aware of the physical and emotional demands of their professions and have some idea about how to manage these demands on their professional journeys. Just as with health in general, and occupation health in particular, retirement is not something that starts happening at a given age, it is a process and an idea that is with us from the beginning of our working life.

From this perspective, the purpose of this chapter was to give a picture of the health and retirement issues that oral health professionals face throughout their lives. It first provided a sound evidence-based approach to a topic that can be considered somewhat uncertain, due to constant changes in the work and retirement rules and circumstances. In doing this, it put in place a solid foundation about what type of information is needed to be confident with one's personal choices around occupational health and retirement, as we advance in our professional lives.

This was followed by detailed personal accounts from five dental academics, frankly describing their concerns and perspectives regarding retirement. These personal accounts were by no means prescriptive. In fact, nobody can predict what is going to happen, the challenges we may face, or the skills and resources that will be required in the near future, let alone in a few more years. Importantly, these reflections highlight the role of policies to build healthy environments and healthy retirements, and they explain the self-care decisions and negotiations with family,

partners, and even society at-large to attain a healthy, productive, and happy retirement.

Reflections by Elham Emami (A Few Years from Retirement)

I have always believed that women need to be independent and to have a distinct social identity to be in full health. Although sexism and chauvinism still remain in many societies, and unfortunately even in academia, I am proud to be among many thousands of women around the world who have proved that being a man is not a predictor of intelligence, leadership, work capacity, or academic performance.

I graduated from dental school 30 years ago, proud to be an honors student, but unfortunately at a time of social policies that didn't allow me to continue my education. I commenced work as a general dentist in a country at war. These are the kinds of unique life experiences that forge a human being and give them the courage to fight for their goals. For many years, I worked in different sectors: industry, public service, and private practice. These years were rich in experience and full of personal and job satisfaction with plenty of life events and moments of both sadness and joy. I was fortunate to have a life partner who encouraged me to go far in my profession and career. Together, we moved to Montréal where I was able to continue my education and become a clinician scientist. Full of energy, I started to teach, supervise undergrads and postgraduate students, write grant applications, and run clinical and public health research projects. I am now a full Professor at McGill University, with various academic and administrative responsibilities. I am not quite sure if I have excelled in managing work–family balance, let's just say I am still married, a mother of one, a good cook, enjoy caring for my family, travelling at least twice a year, and organizing gatherings with good friends.

The process of healthy aging is closely related to the sociopolitical and economic context. More specifically, women residing in countries with women-specific health care, social policies, and programs will have a better chance of keeping their physical and mental health, autonomy, and independence. Having a lifetime strategic plan at an early age will help women to be less vulnerable in old age. In this plan, we should give priority to our education, income, healthy lifestyle and social life, as well as intolerance for any discriminative sex/gender policies related to traditional culture, violence, and harassment. Our planning should also include investment in and respect for good life and career mentors, friends, and colleagues. Strong advance planning will help women to better respond to stressful life events such as death of spouse or close family member, pregnancy, divorce, illness, unemployment, and retirement.

Two main factors will influence my eventual decision to retire: fulfillment and complete satisfaction with my career objectives as well as perception of my usefulness and physical capacity. At this stage, I am beginning to think about the next steps in my career path. This planning is necessary to empower my end of career phase and will definitively have an impact on my aging process.

Doing voluntary work for charity in another part of the world is one option for me, as I believe we all have social and human responsibilities; I may also take some courses to prepare for coaching young women in personal development and

leadership. I will also keep my fingers crossed for full mental and physical health, and many happy years of work ahead of me.

Reflections by Michael MacEntee (Retired)

I am now in my second year of retirement from a satisfying career that began in 1969 when I qualified as a dentist in Ireland. I grew up in a professional family with my father who was a general dentist in a small town in Ireland and my mother who directed the family's domestic activities. My sister toyed with a career in dentistry but opted for nursing, and my brother became a lawyer. The extended family of aunts, uncles, and cousins all had a college or university education and valued work-related achievements.

On completing my undergraduate dental studies in Ireland, I worked as a general dentist for a few years before migrating to Canada with my young family for adventure and further professional development. I moved from a general hospital internship to a school-based dental program and then to general dental practice. After a prosthodontic residency in the USA, I returned in 1975 to a tenured track academic position in the Faculty of Dentistry at the University of British Columbia. Since then I have indulged in an academic career of clinical teaching, research, and administration. As our children became adults, my wife made several transitions from full-time manager of the family to a volunteer and then a paid employee of the government's adult education program. As time gathered speed, we entered our preretirement phase almost imperceptibly, but with growing apprehension.

Preretirement, as expected, was a phase of increasing self-reflection and uncertainty. I did not know whether a decision to retire would bring freedom or restriction, excitement or boredom, gain or loss, and I felt a finality to the decision that was especially disturbing. During the later stage of my career, I had been engaged more with research and graduate students than with undergraduate teaching. I believed that my research discoveries were significant, but I was also aware that the clinical or practical implications were not as clearly exposed as I had proposed to the granting agencies. I grew frustratingly more aware as I approached the possibility of retirement that I had more to do than time in which to do it.

Changes to employment legislation where I lived removed mandatory retirement as I approached 65,[1] so like many people of similar age, I remained gainfully employed. However, a few years later, the barriers to research funding and disgruntlement with the Faculty's administration on the one hand and a robust pension fund on the other prompted many of us to reconsider our decision to remain. I anticipated with some reservations at this stage that freedom from teaching and administrative routines would allow me to tie up the loose ends of my research and explore other interests. My voluntary retirement began in July 2015. Now, about 1 year later, I am more content than disappointed. I feel relief from the restraints of teaching routines, recurrent administrative duties, clinical responsibilities, and the near constant search

[1]The British Columbia Provincial Government's Human Rights Code (Mandatory Retirement Elimination) Amendment Act, 2007 took effect on January 1, 2008.

for research grants. I no longer attend early morning lectures or seminars nor commute in darkness. I can read the newspaper without concern for time and on a whim simply "take-off" without guilt.

I am slowly recognizing that I cannot tie-up all the loose ends of my research and that others will have to continue what I leave undone. I worked over the last year mostly for generative reasons but also to sustain personal and social benefits. I have a pleasant work space at home but I'm still attracted to the university for nourishment of my academic identity. I am not yet ready to close that door permanently.

Overall, I am at ease, probably because I was not pushed into retirement by old age. Instead I initiated the transition with dignity. I am planning the next stage with less anxiety than before. I remain healthy and physically active, while my family is my constant source of refuge. As always, my wife remains comfortingly focused on family. We continue to distribute our domestic responsibilities in a traditional way but with attention to personal preferences and being sensitive to potential conflicts caused by my reallocating from university to home or the "retired husband syndrome" (Stancanelli 2014). Our children and grandchildren live nearby and are closely connected to us. We have extended our network of friends and it is easier now to see how family and friends, along with the freedom of uncommitted time, fills the void that a few years ago caused me concern. My transition is indeed a multistage adjustment with novel challenges through which I move optimistically, enjoying regained freedom to discover new activities.

Reflections by Victor Minichiello (Retired)

My background is in the social sciences. As a public health researcher, I have worked on research projects that have investigated issues related to the oral health of seniors and taught classes in gerontology, nursing, medical, and dentistry programs. My retirement just happened. Of course I read about retirement and heard the stories of people who had retired, including watching my parents retire and enjoy later life. But to me it was something that happened to others. To be honest, I thought I would never retire. And in some ways, I have not retired from academia, but I have retired from the official statistics of the workforce and the bureaucratic obligations of being a paid employee within an institution.

The one major lesson for me is that in life, things are never predictable and the unexpected does indeed happen (I am writing this as Donald Trump is elected President of the United States of America). I was experiencing considerable stress at work due to bad politics between the Chancellor and the University and got caught up in the political battle. Eventually, the Chancellor resigned. During this period, I lost considerable confidence in academia and in the leadership team at the University. But more importantly, I was beginning to feel tired and was showing symptoms that my body was not well. I went to see the doctor and discovered that indeed I was sick. After reflecting in solitude over a long and difficult weekend, on the state of the University and my health, including some serious self-reflection on the meaning of life, I gave my notice and retired. The decision-making moment was really that simple.

Unfortunately, within a few months of my retirement, I was hospitalized. It took me a full year to recover from my illness. I now take medication to control my risk of stroke and other life-threatening conditions. So, for me, health and my perception of bad politics within my work organization were the precursors for retirement.

A year later and it would be dishonest for me to say that I am not still struggling with my health and anxiety about death. Seeking professional help and meditating on a daily basis has helped me regain some of my confidence. Slowly, I am rebuilding my identity and coming to terms with a change in how I view life. I remain academically active by writing, something I enjoy and do not see "as work," and write about the things that are important to me. I do research but have refocused my attention on mentoring younger researchers and selecting projects that engage my mind. I have also reinvested in family and friends, something that I neglected due to having been a workaholic. I have great regrets about this and, if there is one thing I would change, it is my work habit. Life is short and too much work is not good because lifelong established work patterns are difficult to break. So now I spend time doing the things I enjoy or think I could enjoy, like relearning my French and Italian, visiting places for leisure, rather than as an afterthought because you find yourself in a city or country for work, enjoying getting to know people for who they are, caravanning across Australia, and possibly New Zealand, and being more socially responsible in the community. I once read a book by A.B. Facey called *A Fortunate Life*. I consider myself fortunate. I have financial security, a loving family and partner, good friends, an active mind, live in a country free from war conflict, have a social commitment to justice and lifelong learning, and reasonable health. And now I have the time to do the things I want to do and with some degree of self-autonomy.

Reflections by Andrew Rugg-Gunn (Retired)

I thought that in retirement I would study Italian art, learn to speak Italian, and enjoy visits to that lovely country. I was wrong; events took over and I have continued with my lifelong interest in preventive dentistry. Which of the two would have been more fulfilling is difficult to judge, but I can say that my 16 years of retirement have been very enjoyable. To answer the question "would you have done things differently?" is incredibly difficult. Fate plays such a predominant role, especially regarding health, and this can lead to unwanted frustration if planning is too rigid. I retired from my job as head of child dental health in Newcastle University Dental School, UK, in 2001, at the age of 62½, which was half way between the, then, permitted age of 60 and the compulsory age of 65. It was a balance between having sufficient funds from my university pension and sufficient length of time to enjoy retirement. There was discussion earlier in this chapter about partial or gradual retirement. At that time, this was very unusual in my university and an option I did not explore, in part, because I considered partial retirement would interfere with more appealing activities.

The two main reasons for my continued interest in preventive dentistry, rather than Italian art, were that I held a 3-year research grant from the Wellcome Trust, which straddled the year of retirement and that I was appointed to the UK

government's Scientific Advisory Committee on Nutrition for a period of 5 years, the year before retirement. This appointment was difficult to refuse as I was the first dentist on the committee.

The die was cast, and a year after my retirement, I was invited to become a trustee of two dental charities. By far the most important of the two was the Borrow Foundation; I am now chair of trustees. This charity, based in Hampshire UK, provides funds to support community programs and research projects in the field of prevention of dental disease in children, mainly through the use of fluoride. Averaged over the year, I estimate that this occupies me for at least 1 day a week. There is no pay of course, from a charity, but with projects all over the world, I have enjoyed immensely my travels to distant places, helping and advising on projects. For this work, I have to keep up to date with research which requires regular attendance at conferences such as the International Association of Dental Research. Independent of assisting the Borrow Foundation, I spent an enjoyable and productive 3 months in Adelaide University and return there this year. To my surprise, I find that I have accumulated 57 scientific publications since retirement. All this has been rewarding, I hope not only for myself, and very enjoyable. Although the mind slows down in retirement, time that can be allocated to a task is much more flexible, which brings pride and fulfillment. One is also freer to say what you really think rather than being bound by your employer's stance.

Whether to continue to live in the same house upon retirement or to move away is a major decision. I chose to move from Newcastle to Devon, nearly 400 miles away, within 3 months of retiring. I have no regrets over this decision. I lost access to university facilities and friends but I have made new friends, with new interests, and the internet has kept me in touch with science. We are near the sea and in very beautiful countryside which are attractions for us and our family. As mentioned earlier in this chapter, there can be "turf-wars" on retirement between husband and wife (Stancanelli 2014). With more time, I offered to do more of the cooking. This was a bad move as I was so much worse than my wife and I soon learnt to help only where I could be effective.

When reaching retirement, I was very conscious of the need to keep mind and body active. Sixteen years into retirement, I have been fortunate to do both. I certainly have empathy with the views of Dychtwald (2016) mentioned earlier in this chapter that retirement brings release of pressure and a chance to "recharge batteries": I reckon I am within the stage of "new-found freedom." The sea is swimmable in, I have walked the 630 mile SW Coast Path, still play international squash, and, this evening, turn out for Sidmouth racquetball team, no doubt to play some youngster of 18. This has cost me two hip replacements but the UK NHS pays for this. Has my health improved, as predicted by Moon et al. (2012) and Westerlund et al. (2010)? This is very difficult to answer: there have been some benefits, but against these is the relentless march of age-related disease and disorders.

Two hazards to watch out for in this stage are diet and alcohol. The effects of both are evident in some contemporaries. Before retirement, a colleague told me that he had observed an increase in dental caries in those recently retired. He pointed out the temptation of "living in the kitchen," with ready access to all day snacking. Increased

leisure time in the evenings also means that it is all too easy to reach for the bottle. It is very important to decide how you will manage both: there are great opportunities to eat healthily in retirement.

Lastly, but by no means least, the family. Particularly important is the health of your spouse; it makes such a difference to the years of retirement. There will be more time to spend trying to enhance the lives of children and grandchildren. This is much more than any financial help that might be possible—encouragement, advice, and time to listen and talk, are just as important. An esteemed former head of department of mine said at his retirement dinner that all you could now look forward to was "death." I think he was wrong.

Reflections by Rowan Story (Approaching Retirement)

Inspiration can come from many sources, mine came from a patient and a book. I will talk about the patient first, because whatever we do in our professional lives, patients must always come first.

After 7 years of specialist dental practice, I was involved in public health care as a visiting oral and maxillofacial surgeon at a large tertiary teaching hospital. This work had a large component of facial trauma as well as facial deformity, serious infection, and cleft palate surgery. I was also an Air Force Reserve officer treating military patients at a military hospital. At the same time my private practice was developing and my family was growing.

One day I treated a patient who was a senior State politician. She was intelligent, compassionate, and sensible. After she had recovered from her procedure, we talked about her work and mine. I said that I was interested in how things worked, or didn't work, in society. She suggested that I should get involved by standing for election to public office. Later that year there were elections for the State Dental Board. At that time in Australia, each State had a regulatory board that administered the law with respect to dental practice. This law covered registration and also disciplinary matters.

I was elected to the Board and spent 9 years working as a regulator, eventually becoming President of The Dental Board of Victoria. An important function of the board was conducting disciplinary hearings when there was an allegation against a dentist of professional misconduct. If such an allegation was proven, the consequences for the dentist could be serious, including suspension from practice for a period of time or, in the worst cases, permanent removal from the register of practitioners.

At these hearings, a specialist legal practitioner represented The Board and acted as prosecutor. A lawyer usually represented the dentist although occasionally a dentist would represent himself or herself. A panel of board members chaired by the president would hear both sides and act as a tribunal. Tribunal procedures were meant to be less formal and rigid than those of the courts. There were no specific rules of evidence and the tribunal was able to inform itself as it saw fit as long as the principles of procedural fairness were strictly adhered to. As the potential for deregistration of the dentist existed, the hearings were often complex with strong legal arguments put on both sides.

I found these processes, and the law underpinning the processes, to be extremely interesting. I started to read about the concept of procedural fairness, also known as natural justice, and from there further into the law. I completed a part-time university diploma in Policy and Law whilst still a member of the board. This gave me more insight and interest in learning more. This study also helped when I had to draft the board's submission to the State government regarding significant proposed changes to the law regulating the dental profession.

After 9 years it was time to move on from the board. At this time my father was retiring from his surgical practice. It made me think of how I might eventually approach that transition. I had been reading the Irish author and philosopher Charles Handy. His special interest was organizational behavior and management. In his book *The Empty Raincoat*, published in 1994, he described the concept of the "portfolio worker." Handy envisioned a future where the concept of work would change. He saw that people would do different types of work at different stages in their working life as technology changed and as new jobs appeared. People would also have a portfolio of work arrangements at any one time.

This idea resonated with me. It resonated particularly because I understood clearly that surgical practice is time-limited, it is a combination of physical and mental effort, and you have to do it well or not at all.

I put a blank sheet of paper in front of me on my desk. I ruled a line for a horizontal axis and divided it into centimeter markings for the years. Above that I drew a series of lines that were parallel with the horizontal axis. These lines covered family and children's schooling, my practice, the Air Force and potential further study in the law. I made guesstimates of time for each of these areas of my life, including when my surgical practice might cease. I made a reasonable estimate of how long it might take to complete a law degree with a view to working in health law after finishing surgical practice.

I applied to law school and was accepted into the graduate LLB program. With some credit for previous study and with unrelenting concentration and support from my family, I completed my studies and graduated in 4 years. The next step was to complete Practical Legal Training. This is similar to the intern year in medicine before full registration. This had to wait for 2 years while my children completed high school. No matter how committed you are, and no matter how interesting the study, it is always important to balance responsibilities with respect to family. Again the Practical Legal Training had to be fitted around my private practice and public hospital responsibilities. This completed my training as a lawyer.

As a lawyer who is still a surgeon, my legal work consists of a portfolio of interests. I work as a volunteer in a community legal center and also teach law and ethics to first year dental students at the University of Melbourne. My interest in law has led to being appointed to a Ministerial Advisory Committee responsible for advice about health care for prisoners in the State correctional system. In an echo of where my interest in the law started, I also sit on a State Government tribunal that deals with allegations of professional misconduct against dentists.

So how did the planning go? When I drew the diagram I was trying out ideas. Surprisingly, it worked out. Whether that was prescience, or the unconscious

following of a plan, I do not know. I do know that for me I want to be able to do work that is interesting and engaging, whether that is surgery, law or whatever. Although this chapter is about retirement I do not think that "retirement" is the correct word to use in the present day. Transition to different work is a more appropriate concept.

In summary, it seems evident that the planning for this change must take place well before the expected date of the transition. It is understandably hard to think of alternative futures when you are busy with daily life. It is, however, worth trying to look forward and make some plans—who knows, they might work out!

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